MEDICAL REPOSITORY.

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ARTICLE I.

NARRATIVE *of* FACTS *concerning the* INOCULATION *of the* KINE-POCK: *Communicated to the Editors by* BENJAMIN WATERHOUSE, *M. D. Fellow of the American Philosophical Society, Academy of Arts and Sciences, Massachusetts Medical, and Royal Medical Society London, Physical and Literary Society at Manchester, Philosophical and Literary Society at Bath, and Professor of the Theory and Practice of Physic in the University of Cambridge, Massachusetts.*

YEAR before last I published a tract, entitled, "*A Prospect of exterminating the Small-Pox; being the History of the Variolæ Vaccinæ, or Kine-Pox, as it appeared in England; with an Account of a Series of Inoculations performed in Massachusetts:*" And this communication is meant to convey to the public a few more particulars on that subject.

It was said in the pamphlet, that on receiving the vaccine virus from Dr. HAYGARTH, I commenced the experiment on my own children, four of whom, with three of my domestics, passed regularly through the distemper; and that they soon after went into the licensed small-pox hospital in this neighbourhood, and all seven of them were inoculated by Dr. Aspinwall, with the matter of the small-pox, but without the least trait of infection. It was also there mentioned, that by the 1st of September I had inoculated about fifty persons, of different ages, sexes and conditions.

By this time the public attention was thoroughly excited, and if we may judge by the very numerous letters I received from all parts of New-England, requesting further information, as well as a supply of matter for carrying on the inoculation, we must conclude that there never was any thing in

the medical annals of our country that ever excited half the speculation. Nor will this appear extraordinary to those who know the peculiar situation and sentiments of this part of the union. The inhabitants of New-England view the small-pox with a peculiar dread; not that they have ever suffered any very remarkably desolating visitation from it, but the disease has been kept at an awful distance by restrictive laws, and still stronger popular impressions; so that in New-England, the most democratical region on the face of the earth, the priest, the magistrate, and the people, have voluntarily submitted to more restrictions, and abridgments of liberty, to secure themselves against this terrific scourge, than any absolute monarch could have enforced. We cannot, therefore, wonder, that to a people thus circumstanced, the annunciation of a mild, safe, pleasant and *non-contagious* substitute for the small-pox, was received with an ardour bordering on enthusiasm.

The very numerous applications at this time for the vaccine virus embarrassed me not a little. Practitioners were not then apprized of the very small quantity obtainable from a *single pustule*. I threw out a cautionary hint on this subject, and begged even my quondam pupils to protract their applications for *matter* until the practice was more firmly established by experiment, and observed that some unsuccessful cases in the beginning deprived *Scotland* of the benefits of the small-pox inoculation for more than twenty years. But the hint was misconstrued, and the mischief I dreaded ensued.

I had been particularly careful to warn my readers that there were some circumstances which, if not critically attended to, would bring the inoculation of this recently-imported distemper into a temporary disrepute. I pointed out, from the writings of Dr. JENNER, the fallacious sources whence a disease merely imitative of the genuine kine-pox might arise. I mentioned that *matter*, though originally possessing the specific virus, but which had suffered a decomposition, either from putrefaction or some other less obvious cause, would produce a SPURIOUS disease. I related that when the pustule, or inoculated part, had degenerated into an ulcer, that the matter taken from it, though it possessed the power of inflaming the arm, and of raising fever in the person to whom it was applied, was nevertheless *incapable of securing the system against the contagion of the small-pox.*

I felt it my duty in *November*, 1800, to acquaint the public, through the medium of the newspaper, that the kine-pox had, in many places, degenerated from its original cha-

racter, and that this deviation appeared to have arisen from the inoculator taking his matter from the pustule *at too late a period.* To give all possible weight to my cautions respecting *spurious* cases, I added this extract from the celebrated Jenner to Dr. Pearson:—"Much caution is therefore necessary in the progress of this inquiry; and this is my grand fear, that the discovery may fall into discredit from a want of that attention in conducting the experiments which the subject requires: for example, a person may conceive he has the cow-pox matter on his lancet, when, in fact, there may be only a little *putrid pus:* with this he inoculates, and excites a disease of some kind, *but not such a one as will prevent the small-pox.* Thus a delusive inference would be drawn, at once hurtful to the cause, and particularly injurious to *me.* However, truth must appear at last."—And lest the reader's attention should not, after all, be sufficiently roused, I added—"Instances of this kind are recorded to have happened in England, where the patients were afterwards inoculated for the small-pox, and *took the disorder.*"

But these repeated cautions were disregarded by the young and sanguine practitioner, who saw nothing but regular cases, little trouble, and great profits.—If those whom it most concerns will not attend to what is written expressly for their information, they must alone be answerable for the consequences. There are cases where ignorance is converted into a crime.

Perceiving that my reiterated warnings were misconceived and misrepresented, and finding some professional gentlemen in the country so wrapt up in ideas of extreme simplicity, that they encouraged women and children to inoculate each other, I ceased from further expressions of that kind, and endeavoured to content myself with predicting the consequences of aiming to walk in a narrow and unfrequented path blindfold.

During this period, viz. the autumn of 1800, a singular traffic was carried on in the article of *kine-pox matter*, by persons not in the least connected with the medical profession —such as stage-drivers, pedlars, and in one instance the sexton of a church! I have known the shirt sleeve of a patient, stiff with the purulent discharge from a foul ulcer, made so by unskilful management, and full three weeks after vaccination, and in which there could have been none of the specific virus—I have known this cut up into small strips, and sold about the country as genuine kine-pox, coming directly from

me. Several hundred people were inoculated with this caustic animal poison, which produced great inflammation, sickness, fever, and in several cases *eruptions*, with a greater disturbance of the system in general than what occurs in the true disease. It is worthy of remark that I could not influence these people to believe that they had not passed through the true disease, and that they were not secure from the small-pox. So true it is that a man need not despair making the common people believe any thing *but* TRUTH! That vagrant quacks should stroll about the country, inoculating for half a dollar a head, and some for less, is not quite so surprizing as that they should, in such a country as ours, find people weak enough to receive it from such hands! This imprudence ought not, however, to be attributed to the common people alone. Many young practitioners come in for a share of it. Not a few of them first inoculated themselves, and then others, without having ever read more than the newspaper publications, and some not even those, and who were looking out for eruptions, and foretelling appearances and symptoms that are never attached to the disease; and if any very disagreeable occurrence arose in the course of this imprudent practice, the odium reverted to me.

At length a very serious occurrence took place, which arrested, in some degree, this blind rage for promiscuous inoculation; and as this incident is much oftener quoted than understood, I shall take some pains to explain it, especially as it has ultimately turned out to the honour of the *Jennerian* discovery and practice.

I had inoculated two inhabitants of *Marblehead*, a considerable sea-port about 16 miles from *Boston*. The one was a young gentleman, Mr. F. a particular connection of Dr. S. The other was a boy of about ten years old, the son of Dr. D. Dr. S. had obtained some matter from the arm of a common sailor who came from London to Marblehead, in a ship of which Dr. S.'s son was an officer. But this matter, which was *supposed* to have been the *cow or kine-pox virus*, was in fact the *variolous* matter, and Dr. S. began the use of it on his own children, which sufficiently proves the parent was imposed on. The consequence was, the small-pox spread through the neighbourhood, and the municipal authority gave leave for a general inoculation. Previously to this sad accident, Dr. D. had inoculated about forty persons from the arm of his son whom I had inoculated, but did not adhere to my directions respecting the *time* of taking the matter, and

ALL *that he inoculated took the small-pox, either casually or by inoculation.* The consequence was, as might have been foretold, a sudden downfall to the credit of the new inoculation, and not a few execrations on the original promoter of it. Although I saw clearly the cause of this disaster (for I repaired immediately to Marblehead, and saw the chain of their calamity, and examined every link of it in conjunction with Dr. S. and Dr. D.), I found it vain to attempt to explain or palliate, but left its developement to time, that infallible test of truth. There was one thing, however, that attracted the attention of a few, namely, that the two persons whom I inoculated escaped the small-pox, although one was an assistant inoculator, and in some instances nurse, during the whole time that disorder was passing through the town; and the other slept with his brother during the whole of the disease, which was pretty severe. When the popular voice condemned the kine-pox, these two facts plead strongly, in the minds of *a few*, for an *arrest of judgment.**

* *From the Boston Chronicle.*

" Messrs. ADAMS and RHOADES,

" Having noticed some cases of the *supposed* kine-pox, published by Dr. Aspinwall, I think it may conduce to public utility to give you my own case, which was very similar to that given by the above inoculator.

" I was inoculated by Dr. Babbit, of Sturbridge, last December, with matter obtained from a practitioner in Connecticut. The matter had a purulent cast, and was part of a shirt sleeve worn during the plentiful discharge from the ulcerous state of the pustule. The inoculated arm appeared inflamed by the fourth day, and went on inflaming till about the eighth, when it became a running sore. At this time I had *shiverings, pain in my head, back and limbs*, with a *loss of appetite*, and at times was very dull and sleepy. The inoculated part became ulcerous, and discharged considerably, and at length terminated in an *irregular hard scab.*

" I had *eleven pustules* on different parts of my arms, body and face. From my symptoms I concluded I had passed through the true disease; but as neither Dr. Babbit nor myself had ever seen the disease, we were at a loss to determine respecting the appearance of the arm.

" While at Cambridge, attending the Medical Lectures, I consulted Dr. Waterhouse, who told me he very much doubted whether I had gone fairly through the *true* disease; and, to put it out of all doubt, would, if I wished, inoculate me. He did so, and I soon saw an appearance very different from what took place in my former inoculation. The inflammation was not so severe, nor did it resemble a boil so much as the former; nor did it terminate, like the former, in a hard, irregular *yellow scab*, but resembled, about the sixth day, the seed of the common *running mallows*, or what the children call *cheeses*, depressed in the middle. By the seventh day it preserved the same appearance, but grew larger: the eighth day it appeared full of watery fluid. On the tenth day the efflorescence came on, and gradually increased till it extended half round the arm. The whole appearance was now *strikingly different from my former case.* About this time, or rather pre-

At this gloomy period of the business I wrote to my correspondents in England for a fresh supply of vaccine virus, and gave out that the present season was not so favourable for the inoculation as the spring.

I gave Dr. Jenner a minute history of the whole business, and begged him to explain this *deterioration* of the virus: for I wish not to conceal my own perplexity at this period. That worthy man answered, that he had heard of our disasters, and would have given any thing could he have *hallowed* to me through a *speaking-trumpet*, across the Atlantic, only these words—"TAKE THE VIRUS BEFORE THE EFFLORESCENCE APPEARS." He soon sent me a fresh supply of matter, and a very lengthy and most lucid letter, which I cannot resist giving to the public in a pamphlet I am now preparing for the press, because it is a map of the road which the inoculator is to pursue, and which will for ever preserve him from losing his way.

The *Massachusetts Medical Society*, impressed with concern for the evil tendency of the many idle and false reports respecting the *spurious cases* at Marblehead, appointed a committee, consisting of their *President*, *Vice-President*, and myself, to inquire into facts on the spot, and make report. The communications made to that learned body from Marblehead were entirely to their satisfaction. Dr. Drury, of that town, wrote to me a very particular account of his inoculations

vious, my symptoms commenced: besides a slight swelling, and pain under my arm, I had the ordinary symptoms of fever, such as a pain in my head, and tenderness in my eyes, which was increased by the light. I had a tightness or stricture across my breast, an universal affection, *peculiar, and very different from what I ever before experienced.* It appeared to be a specific affection pervading the whole system, and which I felt in every fibre. My feelings were, perhaps, more acute from having rid on horse-back at night, and caught a severe cold. In my former inoculation, my system was oppressed with a train of irregular, and rather stupifying symptoms, with a dull head-ache. In this, my last inoculation, my symptoms arose gradually with the efflorescence, then as gradually subsided, and by the thirteenth day left me as well as ever.

"After my first inoculation I had thoughts of trying the experiment of the small-pox. Had I unluckily done it, I should have added another spurious case, to perplex, confound and discourage the inexperienced practitioner. During my inoculation, Dr. Waterhouse pointed out, from time to time, the difference in the appearances, as well as the symptoms, between the *genuine* and *spurious* cases, or those which will secure the human body ever after from the small-pox, and such as are no security at all.—At present I feel so confident that I have gone through the *genuine kine-pox*, that I have not the least dread of exposing myself to the natural small-pox.

"CYRUS FAY.

"*Nov.* 9, 1801."

from the matter taken from the arm of his son, and appeared to be thoroughly convinced that all his cases were *spurious*. He concludes his candid narrative in these words:

"On the whole, from what I have seen, it is my decided opinion that the inoculation for the kine-pox, if properly performed, *is a certain preventative of the small-pox*. The principal thing to be attended to in this operation, is to take the matter at a proper time, which, in my opinion, as I have now learnt, is commonly on the eighth or ninth day, and in a limpid state. The matter I used was in a *puriform* state, and mostly on thread."

In a letter from the Rev. Mr. Story, brother to Dr. S. dated 7th May, 1801, he says—"It ever has been, and now is my firm belief, that the kine-pox is a sovereign antidote against the small-pox. The only point to be determined is, whether the person has really passed through the *genuine* disease; for much spurious matter has been in use, which, though it may produce some eruptions, will be no security against the small-pox, as was the case of the bulk of those in this place. It appears that Dr. D. took matter for his inoculations on the thirteenth day.—I view the kine-pox inoculation as a most important discovery, and, when better understood, will be carried on with safety and advantage to the public."

To these respectable evidences I will just add, that I had inoculated my chaise-driver eight days before I went on this committee of inquiry from the *Medical Society*, and the clergymen, physicians, and other respectable characters in Marblehead, all declared that their unfortunate cases had a very different appearance. I did more: I found a person in one of the practitioner's families who had not passed through the small-pox, and inoculated him from my servant, that they might themselves see the true disease in all its stages. This crowned their conviction, so that now there is no town in New-England where they are more convinced of the efficacy of the kine-pox as a security against the small-pox, than *Marblehead*. *Lynn*, a town contiguous to Marblehead, has given ample proof of their full faith in this new inoculation, by submitting to receive the benefits of it from my hands.

I have been more particular in narrating the incidents at Marblehead, because they have been so often quoted, misconceived, and misrepresented, and because it may explain similar accidents in other places in America. The like occurrences took place at *Geneva*, and at several places in *England*, especially at *Petworth*, where the matter first sent by Dr.

Jenner to Lord Egremont did not succeed in communicating the disease; and a second supply, from another quarter, gave a *spurious* one: the effects produced formed a counterpart to the disasters at Marblehead. See the whole related by the Rev. Mr. Ferryman, and Mr. Andre, surgeon at Petworth, in a letter to Dr. Jenner and to Dr. Pearson, in *Ring's Treatise on Cow-Pox.*

With a fresh supply of matter from Dr. Jenner, through the hands of Mr. Ring, surgeon, New-street, Hanover-square, and also from Dr. Lettsom, Sir Grenville Temple, *Bart.* Dr. Pearson, the *Vaccine Institution*, Mr. Kerre, Mr. Wachsel, and Mr. Dunning, of *Plymouth*, I recommenced my inoculation in the middle of March, 1801, and have continued it, with undeviating success, to the present time, two short periods excepted. The first interruption in the continuity of my inoculations happened in the month of July, when the weather was *extremely* hot, and when I trusted to the infected thread instead of the fluid warm from the pustule. As I have given a particular account of the effects of the *hot weather* in destroying the efficacy of virus taken on *thread*, with the state of the *thermometer* and *hygrometer* at that time, in the *London Medical and Physical Journal* for October, 1801, I need not repeat it here.

The second interruption was from relying on some of my brethren (to whom I had given the matter) for the recent fluid, and thereby relaxing in attention to the continuity of it in my own patients. This was a source of inexpressible anxiety and perplexity. But for *one* patient the virus would have become extinct a *second* time in this part of the union. I mention this by way of caution to my brethren. Jenner himself informs me that he finds it needful to give and receive assistance, in order to keep up the necessary supply of fresh virus for use. But for the *Vaccine Institution* in London, they would hardly carry on the inoculation without some little interruption. The greatest difficulty in the vaccine inoculation is the scarcity of the virus. The kine-pock has but ONE pustule, while the small-pox has its *thousands and ten thousands.* The numbers of poor children I have inoculated during the hottest weather, in order to keep up a diurnal supply of matter; the anxiety I have endured lest they should fail; and the offence I have given when it was not in my power to transmit an inch of infected thread, are not mentioned in the tone of complaint, but merely to notify the young practitioner, who may be ambitious to distinguish himself in this department of his profession, that

he must not expect to diffuse the blessings of this benign remedy, and reap the rewards of it, without some trouble and some anxiety. Some must labour in breaking the road, and leave to those who come after the easier task of smoothing it.

BENJAMIN WATERHOUSE.

Cambridge, Feb. 1, 1802.

P. S. Although I have hitherto been so fortunate as never to have had a patient whom I had inoculated take the small-pox, I can by no means suppose that all I have inoculated are secure from it. Some never returned to me after the operation; and a few I remain doubtful of, but have not yet had an opportunity to re-inoculate them. They amount, perhaps, to a dozen.

ARTICLE II.

OBSERVATIONS *on the* INOCULATION *of the* KINE-POCK: *Communicated by* JOHN SPENCE, *M. D. of Dumfries, Virginia, to Dr.* WATERHOUSE.

FOR your reply to a letter I took the liberty of addressing to you last summer, on the subject of the Kine-Pox, I beg you will accept my most sincere acknowledgment.

By the polite attention of Mr. Mason, President of the Columbia Bank, I obtained some of the original thread you sent on to President Jefferson, in June, accompanied with a copy of your excellent letter. Immediately on the receipt of this thread, I wrote Mr. Mason, who I knew was extremely anxious to have his family inoculated, not to be surprised if he did not succeed; mentioning at the same time the singular delicacy of the vaccine fluid, how apt it was to undergo a decomposition and become inert, when exposed to much heat, and, in illustration of this, quoting the circumstances attending Dr. Woodville's journey to Paris, as stated in the Medical and Physical Journal, volume iv. This prediction of the possibility of a failure, with thread even recently infected, had, I believe, a good effect. I not only attempted to give the infection by the incision, as recommended by you, but introduced the thread by means of a small *blister*, as advised by Dr. Whyte, who inoculated Lord Elgin's son.—In every way, however, I had the mortification of seeing it fail.

About the beginning of last month, Dr. Gantt obligingly furnished me with part of some infected thread he had just received from the President, on his return from Monticello, where you know he had been practising the new inoculation with great success. Having found this thread efficient in the first instance, I have since continued to inoculate with limpid fluid, taken warm from the arm of a patient present; and, in doing so, have paid a religious regard to Dr. Jenner's direction, never to take the fluid *after the efflorescence comes on.* I have so planned the mode of conducting the vaccine inoculation here, as to have it almost invariably in my power to choose a patient, on *the eighth day of the disease*, with a vesicle containing lymph enough to inoculate from; and by this circumspection, and with the advantages of having patients in succession, I think I could continue the disease in its genuine form for any number of years. I have already inoculated about an hundred, and in this number there have not been more than five whom it was necessary to re-inoculate. This success in communicating the infection has been, so far, as great as I experienced in 1791, when I inoculated for the small-pox, in this town and its neighbourhood, upwards of 600.

Notwithstanding the liberal reception the new inoculation has met with, by the intelligent part of our society, there are a few persons (and to the honour of the inhabitants of this part of Virginia but very few) so prejudiced against every improvement in science, as to treat this mild preventive of the small-pox as a chimera, saying they can have no confidence in it till some cow-pock patients are subjected to the grand test, the inoculation of the small-pox. Not daring to introduce this test here, I some time since entreated Dr. Gantt to be as speedy in making his experiments as possible; but by a late letter I find he is obliged to send to Philadelphia for fresh variolous matter. This will cause an unfortunate delay. In consequence of this a great many have solicited me to address a few lines to you, and to state, as faithfully as I could, the history of the vaccine inoculation under my care. Knowing, Sir, the laudable zeal and benevolence you have displayed in diffusing the blessings of this invaluable discovery, which will render your name dear to every inhabitant of this populous State, I trust I need not apologize for this intrusion, being confident you will take the application of these anxious parents in good part. And such is the confidence they place in your experience and judgment, that your opinion on this subject will be received as equal to the test of the small-pox itself.

I should now submit to your consideration statements of cases extracted from my journal; but as these would be too lengthy, I beg leave to give the result of my observations on the process of the vaccine inoculation, which I have attended to with all the vigilance in my power.

Generally on the fourth, fifth or sixth day, I observe the inoculated part appears a little red and elevated. This increases in the form of a vesicle of a whey-like colour, depressed in the middle, and containing a moderate quantity of lymph, *always perfectly transparent.* On the seventh a beautiful damask-rose coloured areola appears, and increases till the crust or scab is formed. On the ninth, tenth, or eleventh day, the *specific* or constitutional fever comes on, accompanied with, or rather preceded by soreness under the arm, or a swelled gland in the axilla: sometimes this fever is scarcely perceptible. The brown crust begins commonly on the twelfth or thirteenth day, is *indented* in the centre, is glossy, and surrounded with a whitish vesicular ring. Around the crust there is a core, tumid, inflamed, with irritated eminences. When this hardness and inflammation subside, the cuticle assumes rather a livid hue, cracks, and peels off in minute white scales. On the eighteenth or nineteenth day the crust becomes dry and contracted, loses its gloss or polish, and is of a dark brown colour, approaching to black. On the negro this crust is jet black.

From this general process I have met with considerable deviations. In one child there was no perceptible elevation or redness till the eighth day, after which it pursued the usual stages with great regularity.

Hitherto only three of my patients have had the fever so high as to be obliged to go to bed for a few hours. I think the vaccine fever may be strictly termed *ephemeral.* Those who had their fever so high were children attending school, who ran about, and took very active exercise.

The erythematous or efflorescent circle so conspicuous generally on the tenth day, has described various circumferences. Sometimes the efflorescence has extended from the shoulder to the elbow, formidable in its appearance, but without danger, and never attended with much pain, at least the pain is by no means in proportion to the appearance of the inflammation. This efflorescence always disappears in the course of two or three days.

Some have had pretty sore arms, but this has generally been owing to the tightness of the clothes, scratching the pustule, or allowing the linen to stick to the sore. In some unruly

boys I have seen the scab rubbed off four or five times. Cooling applications, particularly weak solutions of sugar of lead, operate in such instances like a charm.

In none of my patients (and I have made very minute inquiries) have I seen any *eruptions*, nor, excepting two cases, any *fugitive pustules* round the inoculated part.

Soon after I commenced the new inoculation here, two spurious cases occurred. A young gentleman of intelligence and discernment, but not bred to physic, who had read with great attention your letter to Mr. Jefferson, and the few books I had on the kine-pox, inoculated three children of a poor family, from the arm of a mulatto girl *late on the ninth day of the disease*. One of these children, a boy about ten years of age, had the *true* disease, and on the eleventh day a small pustule appeared near the inoculated part. The other two children, his sisters, who were inoculated from the *same subject*, and at the *same instant*, had the disease evidently in a spurious form. The vesicular elevation appeared sooner than what I had observed in any of my patients: it was *convex;* and on the ninth day there was on both their arms a rough, prominent, yellow crust, surrounded with a small inflamed margin—no fever—no uneasiness in the axilla.

These children have since been inoculated and done well.—A case bearing some resemblance to this singular one is mentioned by Lord Derby, in a letter to Dr. Denman. See Med. and Phys. Journal, vol. iv. page 2.

On this occasion I felt, I assure you, not a little anxiety, partly from my inexperience in the new inoculation, and partly from an apprehension of losing what I believed to be the genuine vaccine virus; but I soon had reason to regard the occurrence as fortunate. It inculcated on my mind the caution in the first part of this letter, to select from my patients, whom I wished to inoculate from, *those only who, on the eighth day of the disease, had a well defined vesicle, containing a pellucid fluid.*

These occurrences had also the happy effect of teaching those gentlemen who had entire confidence in the benignity and sheltering powers of the vaccine disease, and who supposed it might be carried on with great facility by any body, this useful lesson—"that this gentle, unoffending, and benevolent stranger, was to be treated with the greatest delicacy and circumspection, and entrusted exclusively to the care of those who had studied with attention its real character; and that it would assuredly withdraw itself in that moment in which it was neglected."

These cases gave rise likewise to a circumstance too important to be omitted. The circuit or district court of Virginia, a court of the greatest dignity in this State, except the high court of appeals, meets at this place twice a year, in the months of May and October. Last month, when the new inoculation was making some noise here, the Hon. Judge Prentis, whose place of residence is at Williamsburg, and who had all his children inoculated last spring with the spurious matter introduced into this State, and which did not resist the small-pox, spoke of the Jennerian discovery with a good deal of indignation. Hearing this, I took the earliest opportunity of letting him know how the President had obtained the vaccine matter from you, and that its effects were widely different from any thing he had hitherto seen. Candid and open to conviction, he visited with me a number of patients of all colours, in the various stages of the disease; and, on seeing their arms, at once declared the appearances were completely different from the inoculation on James-River. I then showed him what I believed to be two spurious cases, at which he was forcibly struck, observing that his children's arms had precisely *such a crust and such an inflammation.* He told me, at the same time, that the matter with which his children were inoculated was *yellow*, and the scab of the same colour; and that he never discovered them to have any fever, soreness under the arm, or swelling in the axilla. These cases made such an impression upon him, that he desired me to furnish him with some fresh infected thread, with the necessary instructions for carrying on the new inoculation with certainty. For these instructions I was indebted to your letter to the President. But in order to illustrate the subject more fully to those gentlemen who had been formerly inoculating in that part of Virginia, I quoted these few, but impressive lines, in a letter I had the honour of receiving from you last summer: "Please to present my compliments to Dr. H——, and tell him, that if he inoculated with *yellow* matter, or by his inoculation produced *yellow* matter, I hesitate not to say, that it was not the true disease. Nay, further, if the virus did not lay dormant until the fifth, sixth, or seventh day, it was spurious. If it occasioned inflammation and a *purulent* collection of matter by the third day, I want no further evidence of its being the *spurious*, and not the *true* disease."

Knowing the horrors which the name of the small-pox excites in the minds of the inhabitants of this State, and the impossibility of introducing that disease here, so as to try its

effects on my vaccine patients, I thought it my duty to make such experiments as would prove satisfactory to myself, and ascertain whether or not the matter I had been inoculating with was really genuine. Being convinced by a report of the Vaccine Institution of London, that those persons who had undergone the *specific cow-pock pustule and fever*, were ever after unsusceptible not only of the small-pox, but of the cow-pox a second time, and that those who had undergone the small-pox were also unsusceptible of the cow-pox, I made the two following experiments in the most public manner.

On the 30th of October I inserted, by two incisions, into the right arm of a healthy boy, who had fairly gone through the cow-pox, some limpid fluid immediately from the arm of a patient on the eighth day of the disease. On the 2d and 3d of November, both the incised places were evidently infected. There was a tumour and redness. On the 6th of November the inflammation and swelling had nearly gone off, without producing a vesicle, or any constitutional effect whatever.

On Thursday, the 5th of November, I inoculated myself, by two incisions, with fresh vaccine virus from the arm of a young patient on the eighth day. And here it may be proper to observe, that this patient was one of the *three* who were obliged to go to bed on account of the fever, which came on about forty-eight hours after I had taken the fluid from her arm.

Fifth day, Monday, 9th. Yesterday and to-day the inoculated parts have itched a little. They are now red and elevated. Some medical friends, to whom I showed my arm, pronounce it positively infected.

Eighth day, Thursday, 12th. The inflammation and swelling almost gone.

Eleventh day, Sunday, 15th. The incisions are now dying away like common scratches. No pustule has arisen, nor any constitutional affection whatever.

In the foregoing experiment on myself, I confess I have been disappointed. Being of a habit of body rather corpulent, taking a good deal of exercise, and living freely, I expected, and, indeed, predicted to my acquaintance (on the authority of Mr. Aikin), from the swelling and inflammation which appeared on the fifth day, that I should probably have a vesicle on my arm sufficient to inoculate from. So far, then, as these two experiments go, and I can vouch for the fidelity with which they have been conducted, they contradict the statements of that gentleman.

Of the genuineness of the vaccine matter I now possess, I entertain no doubt; and I might conclude with a small alteration of the words of the celebrated Gaubius on another occasion—"Fallor, ni sua constiterit *Jennero* auctoritas et fides, *naturæ* virtus et ordo."

With sentiments of the highest respect, gratitude and veneration, I am, Sir,

Your most obedient servant,

JOHN SPENCE.

Dumfries (Virg.) Nov. 15, 1801.

P. S. Having seen the direful effects of the small-pox in my native country, among my own relations, and in Virginia soon after my arrival, I think I can appreciate, as well as most young medical men, the intrinsic value of the discovery of the immortal Jenner.

Although I have repeatedly applied to different booksellers for the publications of Drs. Jenner, Woodville and Pearson, on the cow-pox, I have not, as yet, been fortunate enough to obtain any of them. All the information I have from books on this disease has been derived from your first pamphlet, a perusal of Aikin's little work, the scattered observations in the Medical and Physical Journal; but, above all, from your valuable practical letter to President JEFFERSON, so often mentioned in this communication.

ARTICLE III.

ANSWER *of Dr.* WATERHOUSE *to the preceding* LETTER.

DEAR SIR, *Cambridge, Nov.* 30, 1801.

I HASTEN to transmit for your acceptance what transcends all verbal descriptions, the painted representations of the vaccine disease through all its stages, and these, too, contrasted with the small-pox.

They were sent me by my *Magnus Apollo*, JENNER. I sent one to the President, another to Dr. Mitchill, a third to yourself, and keep three myself. I am sorry I am obliged to crease it, as I presume you would choose to glaze it.—Judge of the identity of your disease by these admirable representations of it.

At present I answer generally, that I have no doubt of the

genuineness of your cases, and as little doubt of those inoculated by "the young gentleman not bred to physic," being *spurious.*

Aikin did not write from his own experience, nor even from that of his learned father. I wonder so little at his mistakes, that I admire they are so few. Several there certainly are, besides the one you have detected. Spurious cases will arise if you follow his rules respecting *the time* of taking the matter. There are several streams from the Jennerian fountain, some more limpid than others, but none so clear as the source. Even his private letters to me are as lucid as a sunbeam: "*Ex digito Herculem*" may be said of all of them!

Believe me to be, with sentiments of esteem,
Dear Sir,
Your very humble servant,
BENJAMIN WATERHOUSE.

Dr. SPENCE.

ARTICLE IV.

EXTRACT *of a* LETTER *from Dr.* SPENCE *to Dr.* WATERHOUSE, *dated Dumfries, March* 6, 1802.

I HAVE, from time to time, re-inoculated many of those patients who had undergone the kine-pock, some even a third time, but the effect produced by the virus has always been merely local.

Since I wrote to you I have also inoculated six persons who had evident pits of the small-pox on their bodies, and always by two or three incisions, and with fluid lymph applied immediately from the pustule of a patient present; but although, in all these instances, the incised places were infected, there did not appear on any of them "a *distinct* vaccine vesicle, nor the specific fever and efflorescence, followed by the brown, concave, glossy looking eschar or scab." One gentleman, indeed, who resides near this town, and who chose to submit to the experiment, informed me, that on the fifth day after inoculation he squeezed from the inoculated part two or three drops of limpid fluid, but on the fourteenth day no mark of the incisions was to be seen. I lately inoculated a boy of thirteen years of age, whom I inoculated for the small-pox in 1791. On the fourth day the incisions itched so much that he absolutely tore the parts. They festered; and on the se-

venth day there was a small tumour, with a yellow crust, containing some pus: there was also a little inflammation around the tumour, and a swelled gland in the arm-pit. This was evidently not the kine-pock, but such an ulceration as will occur in an irritable habit, whenever common scratches are treated with the same violence. Three of his brothers, who had not had the small-pox, were inoculated at the same time, and from the same patient. They had the disease very distinctly and favourably, and none of them complained of the itching sensation.—Some weeks since I accidentally punctured the little finger of my left hand with a lancet stained with recent vaccine fluid; but, although I felt the lancet, no blood flowed from the puncture; and, having immediately washed my hands, I thought no more of it. Four days after, however, there was an unusual itching and smarting in my finger, which made me involuntarily rub it very roughly. It still smarted; and, on examining the place, I observed a little conical tumour, raw on the top, and discharging some lymph. For two days it felt very uneasy—was surrounded with an inflamed margin—and I now perceived a swelled gland, painful to the touch, a little above the elbow. Having recollected how the tumour was produced, I attended very minutely to the subsequent circumstances, but no efflorescence took place; no gland swelled in the axilla, although this is not material; no fever ensued; yet the sore did not heal up till about a fortnight after I had bruised the place; but there is a small superficial cicatrix on my finger, which will be visible, I suppose, during life. On my arm, on the contrary, which I cautiously avoided scratching, and which was not injured by a tight sleeve, there was no pustule, nor any ulceration, and every vestige of the inoculation there has vanished.

It is worthy of remark, that in the foregoing experiments with the vaccine virus on those who had passed through the small-pox, this sensation of itching, smarting or burning, has occurred to a much greater degree than with any of my cow-pock patients. I intend to prosecute these experiments; and should the result, in any instance, be different from the cases above stated, I shall immediately let you know.

ARTICLE V.

A REPLY *to Mr.* CRUIKSHANK'*s* OBSERVATIONS *in* DEFENCE *of the* NEW SYSTEM *of* CHEMISTRY, *in the fifth Volume of Mr.* NICHOLSON'*s Journal, page* 1, *&c. In a Letter from Dr.* PRIESTLEY *to Dr.* WOODHOUSE, *Professor of Chemistry in the University of Pennsylvania.*

DEAR SIR,

THOUGH you are an advocate, at least in part, for the new theory of chemistry, the principles of which I controvert, your candour is such, that I wish to address to you what I have to reply to the observations of Mr. Cruikshank on the subject of the experiment with *finery cinder and charcoal*, which you repeated in a manner that does you the greatest credit.

These two substances, though heated separately till no air or vapour of any kind can be expelled from them, yet when, immediately after this, they are heated together, they yield a large quantity of air, a great proportion of which is inflammable, and the new theory, which excludes phlogiston, requires that this inflammable air be a component part of water, which, of course, must be found in one or other of the two substances. Mr. Berthollet thinks it was contained in the charcoal, notwithstanding the heat to which it had been exposed. You allow, with me, that it was in the finery cinder, though we differ with respect to the decomposition of it. But Mr. Cruikshank has suggested a very different hypothesis; maintaining that water is not at all necessary to the production of this inflammable air; asserting that metals and their calces, in a very high temperature, have the power of decomposing fixed air, and that, in this case, the fixed air comes from the oxygen in the finery cinder, and the carbone in the charcoal.

After repeating my original experiment, which he found to be just, he did the same with the calces of other metals, particularly those of zinc, copper, lead, and manganese, and then concludes (p. 4), that "in all these cases the air must come from the partial decomposition of the carbonic acid by the calx, when raised to a high temperature." But the inference that I think is more naturally drawn from them, is, that all these calces contain much water, and little or nothing else. This I have shewn to be the case with respect to several of them, especially that of zinc, and I doubt not but

that some small portion of oxygen may be contained in them all. Indeed, we cannot absolutely say that any substance can be wholly expelled from any other with which it has been intimately combined by any process.

Before Mr. Cruikshank admitted that iron, or its calx, when raised to a high temperature, can decompose carbonic acid (fixed air) in this experiment, he should have tried whether it would do it in any other. If in any case, I should think it would do it when it was heated in this air by a burning lens, by which a greater heat can be produced than in any open fire. But this I found not to be the case, either with iron or this calx of it. In the last summer I went through a course of experiments with this view; but I always found fixed air not to be decomposed by this means; though I found that a portion of this air, and also of all the other kinds of air that are readily imbibed by water, was rendered immiscible in water by means of *heat*, reflected either from the calx of any metal, a piece of earthen crucible, or any other substance on which I threw the focus of the lens, when it was surrounded by this kind of air, confined by mercury or water. This, however, was no decomposition of the air, as there was no oxygen found in it after the process. The addition of permanent air was always *phlogisticated*.

Mr. Cruikshank thought that if this heavy inflammable air came from the decomposition of the carbonic acid by the calx, he should succeed better by employing *iron filings* in the place of finery cinder, "as they would have a greater affinity with oxygen;" and with this view he heated them together with a quantity of "common *chalk*, previously exposed to a low heat for ten minutes." From this mixture he procured a great quantity of air, and he thought that the acid (i. e. fixed air from the chalk) was decomposed by the iron; whereas, when he used well burned lime he got little or no air.

What I infer from this experiment is, that the chalk not being perfectly calcined, contained some water as well as fixed air; and that this water, uniting with the phlogiston of the iron, formed the inflammable air that he found. Water I suppose to be the basis of all kinds of air, and many substances retain it in any degree of heat. Chalk I have found to do it after long exposure to the heat of a smith's forge.

Admitting the fixed air procured in the experiment with the finery cinder and charcoal to come in part from the oxygen in the finery cinder, how is this oxygen to be expelled from the calx, since heat will not do it? And there is no instance, I believe, in chemistry, in which, when heat alone will not

expel any constituent part of a substance, it can be effected without the aid of an *affinity*, in consequence of which some other substance takes its place. But here, according to the new theory, nothing is supposed to take the place of the oxygen in the finery cinder, since it takes nothing from the charcoal, the iron being revived by the mere expulsion of the oxygen which made it a calx.

Mr. Cruikshank lays great stress on the difference that he found in the air that he procured in these processes, from that which is got from charcoal and water. But I have observed that there is a considerable difference in the qualities of heavy inflammable air, not only according to the substance from which it is procured, but in the successive stages of the same process. He will find that I have examined this kind of air, as procured from a great variety of substances made to pass in the form of vapour through hot earthen tubes, and in various other ways, and have given the analysis of them. I always found that the first portion from charcoal was loaded with fixed air, but that, in the course of the process, this disappeared, the air burning with a lambent flame, and that towards the end it approached to the explosive kind, such as is obtained from the metals by acids.

I also found that more or less fixed air is procured by the decomposition of heavy inflammable air by means of dephlogisticated air; and though the air procured from finery cinder and charcoal shewed no sign of its containing any mixture of fixed air (nothing of the kind being discoverable by lime-water), yet when it was decomposed I found much more than the weight of the air, so that it could not have been previously contained in it in a state of solution, but must have been formed by the union of the oxygen in the dephlogisticated air, and the phlogiston in the inflammable air.

That charcoal, uniting with water, should give fixed air as well as inflammable air, I account for by supposing, what is by no means improbable, that this substance contains the elements of both the kinds of air, and that they want nothing but water to enable them to take the form of air.

On the whole, I think it is evident that Mr. Cruikshank finds fixed air in circumstances in which it cannot be formed, and makes it to be decomposed by substances which have no such power.

Submitting these observations to your better judgment,

I am, dear Sir, yours sincerely,

J. PRIESTLEY.

Northumberland, Nov. 21, 1801.

ARTICLE VI.

To the Editors of the Medical Repository.

GENTLEMEN,

I LATELY sent you, in a letter to Dr. Woodhouse, a reply to the observations of Mr. Cruikshank, in answer to one of my arguments in favour of the doctrine of phlogiston, which he says you will be so obliging as to insert in your next number. I have, since that, received a letter from a correspondent in Paris, in which he informs me that the chemists in that city boast greatly of those observations of Mr. Cruikshank, and say that I must now give up the controversy: I therefore beg, that to that letter to Dr. Woodhouse you would please to add this.

I am not a little surprized that such excellent chemists as the supporters of the new theory in France unquestionably are, should make so great account of the aid of a person who has abandoned the most essential part of their system, viz. the necessity of water to the formation of inflammable air. Mr. Lavoisier, treating of the inflammable air from charcoal and water, which is similar to that from charcoal and finery cinder, says, in his "Elements of Chemistry," p. 87 of the English translation, that "it cannot be disengaged from the charcoal, and must consequently be produced from the water." According to the new theory, the union of the oxygen, which is supposed to come from the finery cinder, with carbone, from the charcoal, can only form fixed air, and no kind of air that is inflammable. Mr. Cruikshank must therefore abandon the new theory in order to support his peculiar hypothesis.

If I do not receive a better defence of the new theory from its able supporters in France, I shall soon conclude that it is incapable of any just defence, and that, as becomes ingenuous men, they will abandon it, as Mr. Cruikshank has actually done.

I am, Gentlemen,
Yours, &c.

J. PRIESTLEY.

ARTICLE VII.

An Account *of a* Case *of* Pulmonary Consumption *successfully treated by a* Salivation. *In a Letter from* George Pfeiffer, *M. D. to Dr.* Benjamin Rush.

Dear Sir, *Philadelphia, Jan.* 29, 1802.

Although, in medicine, as in other sciences, the limited faculties, and, consequently, the limited knowledge of man, precludes the probability of his ever being able to form a perfect system, still does it afford matter of pleasure and encouragement to reflect, that by his experience, and the exercise of his reason, aided by those fortunate accidents which have always had so great a share in the prosperous issue of his affairs, he has been progressively conducted to the attainment of grand and important truths—truths by which many of the evils incident to his condition here have been ameliorated or destroyed, and new sources of happiness opened to him.

One of the most pleasing subjects of contemplation afforded by the present period, so rich in moral and physical improvements, is the prospect of bringing into subjection to our art, a disease which has hitherto baffled the collected experience and skill of the whole medical world, and annually given to the grave its thousands and tens of thousand of victims.

This prospect was presented to my mind by the perusal of three letters, written by you to Dr. Miller, of New-York, on the salutary effects of a salivation, and also of tonic remedies in pulmonary consumption.*

Do not think I mean to flatter you, Sir, when I declare that I never read any thing in my life which excited a feeling more nearly approaching to ecstacy, than did that little production.

Instantly I determined to avail myself of so promising a practice in the very first consumptive case that should offer itself to my attention.

Besides several doubtful and complicated cases, I have lately met with one which, to me, appears unequivocally to have been a true phthisis pulmonalis.

In the hope that it will give you some satisfaction, I take the liberty of transcribing the history of it for your perusal.

* See Med. Rep. vol. v. p. 5.

—— Will, aged fifty-five years, a tall, slender man, by trade a house-carpenter, when labouring under a catarrh, in the summer of the year 1794, was suddenly seized, during a violent fit of coughing, with an alarming hæmoptoe, by which he lost a considerable quantity of blood, and his strength was much reduced. It was soon checked, however; and though there were several slight returns of it, he, in a few weeks, recovered his usual share of health, and followed his trade without inconvenience, till the autumn of 1798, when he suffered an attack of the yellow fever. Since that period he thinks he never has felt so strong as he did before; and through the course of the last summer his strength declined so rapidly, that by the beginning of September he was scarcely able to continue his work; and towards the end of the same month he was seized, as he thought, with the bilious fever, which was then the reigning epidemic in Philadelphia, and very prevalent in the Northern Liberties, where he resides. But the symptoms of his disorder, from the very beginning of his confinement, so far as I have been able to collect them, both from his own mouth and his wife, instead of bearing the character of our autumnal remittent, were rather characteristic of hectic fever and advanced pulmonary consumption. They were frequent and irregular alternations of chills, fever and sweats, with pain in the thorax, and a distressing heavy cough, which was most severe at night, attended with a copious expectoration of pus-like matter. There was also a steady, and often an excruciating pain, in his left hypogastric region, but no perceptible enlargement. Under these symptoms I found him labouring early in December, when I first saw him, and so weak as to be unable to rise from his bed without assistance.

A few minutes at his bed-side were sufficient to impress my mind with the most thorough conviction that he was far advanced in phthisis, and that, without speedy relief, he would probably not live more than a few weeks, and certainly not till spring. He had taken some medicines, amongst others nitrous powders; but without any relief.

I immediately prescribed your nitrous antimonial powder, with a little opium, and from half a grain to a grain of calomel in each, and directed him to take three powders daily. At night he took an antimonial anodyne draught; and on the painful side I ordered a quantity of warm spirits, or camphorated spirits, to be rubbed several times a day. This course was pursued for about ten days, when, observing no effect to be produced on his mouth by the powders, I ordered, in ad-

dition to them, strong mercurial ointment to be applied to his side twice a day, instead of the camphorated spirits.

After an ounce of the ointment had been used, a gentle salivation began, which continued about three weeks, with scarcely any inconvenience to the man, who took no other medicine, after the salivary disease was induced, but a paregoric draught occasionally.

As the spitting progressed, all the symptoms of his disorder gradually subsided; and, by the time it ceased, his irregular chills, fever and sweats, as well as the purulent expectoration, and the pain in his side, had entirely left him. Only a slight cough remained, which was soon vanquished by the paregoric draughts above-mentioned. His appetite and strength returned, as if by a charm; and, on going to his house a few days afterwards, I was both astonished and delighted to find him hard at work with his saw. He declared he felt perfectly well, and was not at all fatigued by his labour. I advised him to take two or three glasses of Madeira wine every day, for some time, to keep his bowels open, and wear a flannel shirt next to his skin. I saw him, for the last time, on the 23d instant, when he still continued in perfect health.

Thus, Sir, have I given you a faithful account of what, to me, appeared a desperate case of disease, and which I had very faint hopes of being able to conquer, even with the aid of the Hercules of Medicine, although I had your powerful testimony in its favour, and my own knowledge of its general and unexampled efficacy.

As the issue has turned out, I contemplate myself as having been, through you, the humble instrument of rescuing a fellow creature from certain death.

Believe me, dear Sir, I consider myself greatly your debtor, and am, with true respect,

Your obliged friend and humble servant,

GEORGE PFEIFFER.

ARTICLE VIII.

To the Editors of the Medical Repository.

GENTLEMEN,

THE first number of the fifth volume of the Medical Repository, containing a reply to my remarks on the subterranean wall, by Dr. James Woodhouse, Professor of Chemistry in the University of Pennsylvania, came to hand at the time I was preparing for a journey into the northern parts of Vermont. On reading the reply, I determined to give it an answer the first leisure hour. My journey, however, consumed nearly two months; and, on my return, I found, for several weeks, no leisure for the proposed answer. After so long and indispensible a delay, and after I had more attentively read the reply, I formed the determination to continue silent on the subject. This determination was adopted, not because I considered my opinion, that the wall is a production of art, refuted, nor because I had renounced that opinion; but because I viewed my former observations as a sufficient refutation of the reply, and was perfectly willing to submit the question, without any additional remarks, to the decision of the scientific readers of the Repository.

But, since my silence has been construed into a renunciation of my opinion; since Dr. Woodhouse has very politely and *modestly* reported, that, after reading his reply, I was fully convinced of my error, had published a retraction of my sentiments, and extremely regretted that I had ever written any thing on the subject;* I feel myself compelled to come forward, and remind the Doctor, that the information with which he has obliged his friends is wholly incorrect; that his reply, although managed with *great ingenuity*, has not produced conviction; nor induced me to retract, either publicly or privately, my former opinion; nor excited the least regret that the account of the wall was published.

I will now briefly review the arguments contained in the reply.

1st. The author both commences and concludes his attack with what he probably considers a refutation of the idea that

* That Dr. Woodhouse has thus reported, I have received information through a channel too direct and respectable to admit, for a moment, a doubt of its correctness.

the wall was constructed by some enlightened antediluvian nation. Is he alarmed with the apprehension that the wall, should it be admitted to be artificial, may throw some light on the subject of the general deluge, or the manners and customs of the antediluvian world? If it will afford any alleviation to the anxiety of the good Doctor, I have no hesitation to declare, that, until a farther investigation of the wall be made, I have no intention to deduce from it any proof or inference in favour of the Mosaic account of those subjects.

In my account of the wall I intimated that it was not necessary, in discussing the main question, to show the precise object for which the wall was made. A probable object was then mentioned, after which several others were stated as being possible, which the replier has been pleased to pronounce, with a degree of sarcasm, merely imaginary. These objects, it will be remembered, were stated, not as probable, but possible; and they will still be considered possible, until Dr. Woodhouse shall have proved to the contrary. He has prudently omitted to include, in his general censure, the only object stated as probable, and has passed it by wholly unnoticed. From my observations on the subject, every intelligent eye would have at once discovered it to be my prevailing belief that the wall has stood many centuries, and was originally constructed for a wall of defence. And, let me ask, is it the part of a logician, or a philosopher, in sober debate, to aim his whole force at ideas which are professedly imaginary, or, rather, which are stated as merely possible; and to pass over those which are stated as probable, and on which the writer has grounded his argument?

2dly. "Muscle-shells," says Dr. Woodhouse, "exposed to the action of fire, are almost entirely converted into quick-lime; but in one hundred parts of the cement there is no more than five parts of this earth."

It is then true, as appears from his own analysis, that one ingredient in the composition is quick-lime.

But there is still an objection. "Muscle-shells contain no iron, and there is a considerable portion of this metal in the cement."

Does not experience teach us, that, by a partial decomposition of iron, the contiguous earth will, in the course of a few years, be in some degree impregnated with the properties of the metal? Does not the composition of lime and clay, contiguous to an iron bolt, in a brick or stone wall, imbibe some portion of the iron? And is it unphilosophical to sup-

pose that the cement has been thus impregnated with the iron property, or even with all the properties of the stones which compose the wall?

3dly. "What is called fullers' earth," it is said, "never turns of a white colour like the cement; and the clays of this country, with a few exceptions, burn of a red colour."

Under this head Dr. Woodhouse proceeds on the ground, that I had given the opinion that the cement is composed of fullers' earth. No such opinion was advanced. The ground is false; and, of course, the argument built upon it must be incorrect. In my remarks on the wall, I observed that, at a small distance, there is found a species of clay, resembling (externally) fullers' earth, without any intention of marking its specific character.

It appears that there are a "few exceptions" to the Doctor's general rule. May not the clay, mentioned as probably a component part of the cement, be a species included among the exceptions?—Notwithstanding the arguments and experiments of the mineralogist, sufficient, it is believed, has been advanced, under this and the former head, to justify the supposition that the cement is clay, or a mixture of lime and clay, impregnated with the properties of the stones.

"In order to prove," continues the replier, "that the cement is composed of fullers' earth, or of this kind of earth mixed with burnt muscle-shells, it will be necessary to show that a mechanical mixture of these substances gives the same principles by analysis as the cement."

I have in possession none of the clay nor shells with which to execute the proposed analysis. I might, perhaps, be more solicitous to obtain the ingredients, were it not, as I shall hereafter attempt to prove, totally unnecessary, in supporting the principal question. For the present, I will leave it to Dr. Woodhouse to "show, that a mechanical mixture of those substances," *when equally impregnated with iron*, "will give, by analysis," *different* "principles" from those of the cement.

4thly. A passage is quoted from Garnet's Tour through Scotland, to show that the regularity of the wall is no proof of its being a production of art.

The quotation I have read; and, with pleasure, acknowledge my obligation to Dr. Woodhouse for conducting me to an authority so corroborative of my own remarks. In the passage, in the volume from which it was taken, and in the accounts of Fingal's Cave, the Giant's Causeway, and the ba-

saltes of various countries, given by the most distinguished mineralogists of Europe, I have discovered nothing contradictory to my former observations on this subject. Although regularity is strikingly visible in some of the pillars of Fingal's Cave, yet most of the vast pile is extremely irregular; and the whole mass, taken collectively, furnishes an exhibition of rudeness, of sublimity and grandeur, beyond any thing ever formed by the human hand. The object is so stupendous, that no enlightened eye ever, for a moment, viewed it as the work of art. It has not the appearance of having been formed of individual stones, by the industry of man. It is not, throughout, constructed with uniform mechanical exactness. With all its regularity, it bears evident marks of the rude hand of Nature.

5thly. An extract from the British Encyclopædia, which had been brought forward to prove that the strata of basaltes never run horizontally, is asserted to be "not true." In support of his assertion, he has mentioned the authority of Mr. Strange, and of M. l'Abbé Giraud Soulavie. I regret that I have not been able to procure the volumes to which he has here referred. I have, however, read a number of the most eminent authors on the subject of basaltes, and have not found a suggestion in support of the horizontal position of the strata, *while in its native state.*

Garnet, in his Tour through Scotland, a work which Dr. Woodhouse has more than once quoted, remarks,* "The basaltic pillars of Staffa are all magnetic; the lower parts possessing a north, and the upper parts a south polarity." Again:† "On the top of the island, above those ranges of columns, the green turf was often interrupted by lesser pillars, inclined in almost every direction, but generally dipping towards the west, forming an angle of 30 deg. with the horizon." In describing the small island of Booshala, the same author observes,‡ "This little island, which is in the form of an irregular pyramid, is entirely composed of basaltic pillars, inclined in *every direction*, but *generally* pointing towards the top of the cone: many of them are, however, horizontal, and some are bent into arches of circles."

In this passage the author does, indeed, mention a solitary instance of the horizontal position of the pillars; but this is evidently an *accidental*, and not a *natural* position. The

* Garnet's Tour through Scotland, vol. i. p. 230.
† Garnet, vol. i. 219.
‡ Garnet, p. 220.

learned naturalists who have examined these astonishing curiosities, concur in the opinion, that this island, or rather this basaltic pile, was originally a part of Staffa, and has been broken asunder by some great convulsion—possibly by the waves of the ocean. It is not at all singular, that, in the general confusion, the pillars should be thrown "in every direction;" and that many of them should fall into a horizontal position. From this broken and confused mass nothing can be inferred respecting the natural direction of the pillars or strata.

Similar may be the facts with the basaltes described by Mr. Strange, and by M. l'Abbè Giraud Soulavie.

Dr. Woodhouse ought to have pointed us to some collection or wall of basaltes, many hundred feet in length, of considerable height, of uniform thickness, and composed of fragments running horizontally, extending one third, or one half of the thickness of the wall, and forming a right angle with its length. Until he shall have shown a pile, bearing, at least, some general resemblance to this, the reader will, it is presumed, allow the extract to be correct, and will give full weight to the argument grounded thereon.

6thly. He also pronounces unjust, the observation that there is nothing between the basaltic columns of other countries resembling the cement of the wall. He says, on the authority of Garnet, that "a cement of a beautiful white colour is found between the basaltic pillars in the Cave of Fingal."

Like a prudent logician, the Doctor has omitted to give us the passage, lest he should prove too much, and his argument fall to the ground. The passage referred to I here take the liberty to transcribe:—"Between these pillars is often found a cement, generally of a beautiful white colour, interspersed with rhomboidal and prismatic crystals, which are sometimes tinged with green. This substance is, in general, calcareous spar (crystallized carbonate of lime). In some instances, however, the place is filled up with infiltrations of beautiful white zeolite. In the very midst of the basaltic pillars, when broken, are to be found pieces of radiated zeolite."*

That these substances are found in the cement of the wall, it will be remembered, the replier has not pretended.

It will also be remembered that Garnet, in the passage above quoted, asserts that a cement is often found between the *pillars*—not *between the strata* which form each individual

* Garnet's Tour, vol. i. p. 224.

pillar; whereas, in the wall, each fragment, or stratum, is entirely covered with cement. But, as this extract appears to be so unfortunate for Dr. Woodhouse, it would be, indeed, a violation of delicacy to accompany it with any farther comment.

Had Garnet informed us that the pillars, like the wall, are composed of small distinct fragments; that each fragment is completely covered with cement; and that the external surface of each pillar is plastered with a similar substance, I would, at once, have relinquished this part of the argument. Unless I receive such information, I shall continue to indulge the opinion, that the wall, as it respects its cement, differs materially from the basaltes of other countries.

Dr. Woodhouse, in a letter* to the Rev. Mr. Hall, remarks: "The fine white friable matter, with which you suppose the wall has been plastered, is owing to chemical decomposition."

On this supposition, how is it possible, let me ask, that the whole face of the wall should be smoothly and firmly plastered with the decomposed substance? Would not each individual fragment, after the partial decomposition of the external surface, retain its original figure; and would not the face, or side of the wall, be filled with cavities or chinks?

Under another head, which shall be again noticed in its order, he informs us that "the stones are decomposed or calcined by the agency of water."

Were this the origin of the cement, is it not rational to suppose that the parts, constantly immersed in water, would be found in a greater degree decomposed, would contain a greater quantity of cement, than the parts which are perfectly dry? Should one part of the wall, or of each fragment, be decomposed with more expedition than the other, as, according to his theory, must unquestionably be the fact, would not the part first decomposed first settle, and thus lean or incline to the one side or the other, in various parts of the wall? Would the wall be uniformly erect, firm and strong?

7thly. Dr. Woodhouse informs us that "he has fused the stones of the wall with the greatest ease in half an hour."

As I acknowledged that the stones may be of the basaltic character, it is unnecessary to make any reply to this head. In justification of my remark that the stones are not fusible by a moderate fire, I will only observe, that I made the experiment in a very hot fire for more than half an hour, without producing any visible effect.

* Published in the Medical Repository, vol. ii. No. 3.

8thly. Dr. Woodhouse says, "The position that neither stones, nor other mineral substances, are covered with rust unless they have been exposed to the action of the aërial acid, is not accurate."

I suspect our author, should he go a little more deeply into the subject, would find his own remarks fully as inaccurate as the position he is attempting to refute. The word rust, he informs us, "is a vague term, and conveys no precise idea to the mind." It is, however, believed, that the simple term *rust*,* as vague as it may be to the mind of our chemist, conveys to the minds of others as "precise an idea" as the phrase "ochreous matter."

"The brown ochreous matter," he tells us, "with which the stones are covered, has been formed by the agency of water, acting upon the iron they contain, which has decomposed or calcined them. The aërial acid has no action in the business. The same kind of rust is found on the basaltes of other countries."

It is not a little amusing to see Dr. Woodhouse soberly use the word *rust*, which, within the limits of six lines, he had condemned as being a "vague term," and as "conveying no precise idea to the mind." An inconsistency this, which we should scarcely have expected from a gentleman of his acknowledged precision of idea and expression.

But what is the "precise idea" which he wishes to "convey to the mind," when he informs us that the stones are decomposed or calcined by the agency of water? Would he teach us that water is a simple substance? or, that all the substances which generally, and which occasionally constitute the combination, have equal agency in decomposing and calcining the stones? If the latter, can he, with propriety, contend that aërial acid, or, in more modern language, carbonic acid, "has no agency in the business?"

If the opinion of Chaptal, that "the oxydation or calcination of metals (and of substances containing metal) is owing to oxygen or vital air,"† be just, while I acknowledge my position to be inaccurate, Dr. Woodhouse will be pleased to confess that his remarks are *also vague and incorrect.*

* Should it be said that the word "rust" is not a technical term, and therefore ought not to have been used on such an occasion, I have only to observe, that I am justified in the use of it by the example of the eminent Chaptal, of Montpellier, whose volumes on chemistry are highly and justly esteemed.

† Chaptal's Chemistry, vol. i. p. 162.

9thly. Dr. Woodhouse triumphantly asserts, "The stones composing the wall are certainly basaltic, as every mineralogist can tell by inspecting them."

This, it will be remembered, was granted, in a paragraph towards the conclusion of my former observations on the wall. This short paragraph, as Dr. Woodhouse appears to have either overlooked or forgotten it, I will here repeat:

"In some parts of Scotland great quantities of basaltes are found, in fragments or single stones, lying on the surface of the earth. The stones in the wall, as well as those on the adjacent hill, may, it is acknowledged, be of a similar species, and may have been thrown up by a volcanic eruption. They must, however, have been collected, and placed in their present situation by the hand of man."

It may here be observed, that should Dr. Woodhouse show, that neither the clay in the region of the wall, nor a mixture of the clay and burnt muscle shells when impregnated with iron, will give the same principles by analysis as the cement; should he give unquestionable testimony that the cement is decomposed or calcined basaltes, it would gain him nothing in favour of the natural production of the wall. For, if the stones, on the supposition of the natural origin of the wall, could have been decomposed or calcined by the agency of water, they certainly could, by the same agency, have been decomposed or calcined, if laid up, without cement, by the human hand. Thus, it is believed, the only plausible argument against the artificial production of the wall is sufficiently obviated.

It will be recollected, that the question in dispute is, not whether the materials are basaltic, but whether the wall is a work of art or of nature. And it is believed, one hour on the spot, devoted to a diligent examination of the form and construction of the wall, will better enable a person to give a just solution to the question, than years employed in analyzing the materials, or in studying the history and character of the basaltes of other countries.

10thly. In his letter to Mr. Hall, Dr. Woodhouse observes, that "the small stones (found in the wall) may have been carried down from the surface of the earth by rain, and deposited in the places where they are now found."

Rain must have possessed astonishing power to "carry down *stones* from the surface of the earth," through a deep and compact bed of sand or gravel, and deposit them in the wall! Surprizing must have been its taste and judgment, to select

stones of a long and handsome figure, and in every instance, of suitable size to fill the crevice, and firmly wedge the wall! Admirable indeed must have been its ingenuity, to convey stones of one, two, or three inches in diameter, through extremely narrow crevices; and with them, fill the various cavities in the middle of the wall! But still more astonishing and mysterious must have been its skill, to convert these small stones, which now are evidently of the same specific character with the wall, into basaltes! Dr. Woodhouse has not furnished us with the chemical process by which this singular transmutation was effected, nor the "precise" philosophical reason why his ingenious artist should have taken the trouble to carry down *stones* from the surface of the earth, and *deposit them*, while the sand was so much more handy, and more easily managed.

In the eleventh place, Dr. Woodhouse, in the same letter, informs us, that "the rock which embraces the wall is granite," and that "he does not suppose the rock was formed after the wall, granite being one of the first formed substances in nature." The rock, he adds, "has probably been burst asunder by the wall, which is, perhaps, of volcanic origin."

With his accustomed facility at quoting authorities in point, he has directed us to Cronstedt's Mineralogy for an instance in which a rock of granite, in Upper Lusatia, "has been rent asunder by a vein of concentric basaltes." Would he not have proceeded less unphilosophically, had he attempted to prove, in the first place, that there is, in fact, a rock "embracing the wall;" and, in the second place, that the rock is granite, before he undertook to assign the cause of its particular situation.*

The fact is, that, so far as the wall has yet been examined, no rock of any description has been found.† The bed of

* It is thus storied of the wise men of a certain kingdom.—Their Sovereign, having called them together, proposed the following question—"Why will not the weight of a vessel, filled in part with water, be increased by the addition of a living fish?" The wise men declared the question to be new, and begged permission to retire, each to his philosophical chamber, where he might go into a thorough investigation of the subject. A few days after, when again summoned, each, in order, read a long and learned discussion of the novel and perplexing question. Various causes were assigned, and many *positive* and *unanswerable* arguments advanced. His Majesty, having patiently heard them through, gravely dismissed them, with a second question for consideration; to wit, "Is it the part of a philosopher to attempt to assign causes for a thing, before he shall have ascertained the *existence of the thing itself?*"

† When I visited the wall, I examined with a particular view to ascertain whether there is a rock in any way connected with it. I found none. And

sand, or gravel, contiguous to the wall, has become, in some parts, more compact, and more approximating in its texture, to the firmness and hardness of rock, than in others. The sand, improperly termed rock, will, even in the hardest part, yield without difficulty to the hoe, or the shovel. It will be useless to tell us of the rock, as we are told of the wall, that it is "decomposed or calcined." Were a rock of granite to be burst asunder by a "vein of concentric basaltes," some positive and indelible marks of the great convulsion would remain. There would be found checks or interstices between the wall and the rock; and these checks or interstices, if filled at all, would be filled with a substance different from the rock. But, instead of this, the sand adheres uniformly and closely to the wall; and contiguous to the wall, there is no such variety, or difference, of substance.

Let us for a moment, however, go on the ground, that the wall *is* embraced by a rock of granite, and examine the reason which induces the belief, that the rock was formed before the wall.—"Granite," says Dr. Woodhouse, "being among the first formed substances in nature."

If this sentence "convey to the mind any precise idea," it is, *that no granite has been formed since the creation of the world;* for if granite could be formed after fifty years, or one year, no reason can be assigned why it could not be formed after *fifty centuries.* And if that be the idea, it is contradicted by the united testimony of Bergman, Fourcroy, M. de Saussure, and the compilers of the British Encyclopædia. These all concur in the opinion, that granite is a combination of quartz, feld-spar, mica, and schorl; that when these substances come together by any casualty whatever, they form the genus called granite; and that the several species are produced by a varied combination of the constituent materials. Some of the authors mentioned have also exhibited specimens of newly formed granite. Hence I deduce the conclusion, that the position assigned as the reason for the opinion, that the "rock was formed before the wall," is wholly incorrect.

In the twelfth place, in the conclusion of the reply, Dr. Woodhouse *wisely* remarks, "that the supposition that the North-Carolina wall has been constructed by an enlightened antediluvian nation, is as unphilosophical as the belief of some of the common people of Scotland, that the cave of Fingal is

Dr. Newnan, of Salisbury, North-Carolina, a physician of the first respectability, and a member of the American Philosophical Society, who has devoted more time and expense to the investigation of the wall than all others collectively, has lately assured me that no such rock has yet been found.

artificial, and was built by a race of giants, for their celebrated Chief, Fion-Mac-Cool, the father of Ossian."

This satirical and groundless sentence, I am fully sensible, does not deserve a serious answer. In ordinary circumstances, I should pass over it with the neglect it merits. But, as I am compelled to combat the opinions of a philosopher on a philosophical subject, I choose to examine *this profound* remark, to penetrate through the splendour which surrounds it, and expose to the light its incorrectness and absurdity.

On the cave of Fingal I have already made sufficient comments. It is an object, to construct which far exceeds human power. It is formed on a scale too extensive, too sublime, too rude to admit the belief, that it was produced by the efforts of man. It has not an impression of the human hand—it has not an appendage which betokens the work of art; and none but the peasant as uninformed as the brute in his field, ever supposed it artificial. Of course, the belief attributed to "some of the common people of Scotland," is indeed strictly "unphilosophical."

But has this any application to the supposition that the wall was constructed by an enlightened antediluvian nation? I well know, that some of the "wise men of the world" consider the supposition of a *general deluge* as unphilosophical. I equally well know, that this supposition has been adopted by the most useful and distinguished philosophers the world has yet seen. While I find myself supported by such illustrious characters, I willingly hazard the imputation of being "unphilosophical." I hesitate not to declare my *full and decided assent* to the testimony given us in support of the general deluge. On this ground, it cannot, with truth, be pronounced unphilosophical to suppose, that, previous to the deluge, the western, as well as the eastern continent, was inhabited. And if inhabited, where is the absurdity of the supposition, that the wall was then constructed; and that in the deluge, the face of the country was in some degree changed, and the wall covered with earth?

Let it again be observed, that, although I do not possess sufficient sagacity to discover the extreme absurdity of the supposition, it is not, however, my belief, that the wall was formed before the deluge. Nor is there in the remark, which appears unfortunately to have given some inquietude to Dr. Woodhouse, a suggestion of the belief.

I am, Gentlemen, with the highest esteem,
Your obedient and humble servant,
ZECHARIAH LEWIS.

New-York, February, 1802.

ARTICLE IX.

REMARKABLE CASES *of* MADNESS: *Communicated by Dr.* JOHN VAUGHAN, *of Wilmington (State of Delaware), to Dr.* MITCHILL.

Wilmington, March 17, 1802.

DEAR SIR,

IN presenting you with the following account of a family-mania, I am flattered with the belief, that it will be ranked amongst the wonders of the nineteenth century. When witchcraft and conjuration swayed the sceptre of public opinion, the narration of this fact might not have excited much attention; but in the present day it will be deemed an interesting evidence of the frailty of the human mind.

The family in which this infectious mania occurred live a few miles north-west of this borough, and have long been esteemed industrious, orderly people, until August last, when they became infatuated with the notion of being *possessed with an evil spirit.*—Their phrenzy is thus described by a respectable farmer who was an observer of a part of the tragedy:

"On the 3d of August, 1801, S— S— came to his mother's (who had been insane for some time) to settle some business with her, when she caught him round the neck, and kissed him, telling him he should become a preacher of the everlasting gospel, when *he* immediately became crazy, and thought he was inspired. On the evening of the next day she kissed him again, and also kissed two other sons, two daughters, and two daughters-in-law, and the whole of them became frantic immediately.

"On the morning of the 5th I was sent for in great haste, when I found the whole family in the utmost confusion, believing they were possessed with an evil spirit; adding, that their mother had died a week before, and satan had entered into her body, and communicated himself to the rest of them by *a kiss!* Under this impression, they had dragged the old woman out of bed, and nearly beaten her to death. After a considerable struggle I rescued her from them, and laid her in bed. They then endeavoured to set the house on fire, to consume the tormenting demon in the image of their mother; but several of the neighbours collecting, we se-

parated them, and prevented further mischief. In the course of a few days they all became peaceable and rational but John, who afterwards became your patient.

"WILLIAM SIMONSON."

Of the truth of these circumstances, related by Mr. Simonson, there can be no doubt. I have, for many years, known him to be a man of unquestionable integrity, and highly respected in his neighbourhood; and, as he lived within a few rods of the infected family, I applied to him for an account of the fact.

John S—, who is mentioned as becoming my patient, remained irascible after the recovery of his brothers and sisters, and was confined in the Paupers' Infirmary for a few days, where he was freely blooded without relief; and on the tenth day of his disease he was brought to the house of a relation in this town.

I was called to see him on the following day, when I found him chained to the floor, with his hands tied across his breast —clothes torn off, except the shirt—his feet and elbows bruised considerably—and his countenance, grimaces, and incoherent language, truly descriptive of his unhappy condition. As he was free from fever, and his pulse not tense nor preternaturally full, I deemed this a fair case for the application of cold water, as recommended by Dr. G. G. Brown, in *apoplexia mentalis*, or *delirium sine febre*. (See Med. Rep. vol. iv. p. 209.) Accordingly a linen cloth was wrapped round the head, and wetted every few minutes, by a sponge, with cold water, for five hours, without any sensible effect.

On the twelfth morning of the disease it was resumed, and continued until it induced chilliness; and as it produced no relief, his friends became impatient of a remedy apparently simple; and on the next day his head was shaved, sixteen ounces of blood taken from the arm, and a cathartic exhibited. The succeeding night he slept tolerably well, but remained incoherent; and on the fourteenth morning a blister was applied to the scalp, and the purge renewed, which relieved him so far as to enable him to go home, and attend to the business of his farm. He, however, retained some idea of his previous delusion, and believed he was commissioned to be a preacher, and entitled to support from the public; but the infatuation gradually wore away, and he is now perfectly restored.

The rest of the family remain well. The old woman *actually* died in a short time after the melancholy scene of confusion before-mentioned.

This case affords ample source of speculation to the metaphysical pathologist who wishes to explain the morbid affections of the mind and body. For my part, I confess myself much at a loss to attempt any explanation of this extraordinary form of mania, independent of any previous bodily disease. Dr. Rush denominates mania a state of fever, but I presume the present affection is an exception to that doctrine.

It may be observed that the mother had been, for some months, in a chronic state of insanity, and as her children, no doubt, were much interested in her condition, their affections wrought up, at this juncture, by a final settlement of business which impressed them with apprehensions of her being irrecoverable, together with the predisposing force of prejudice and credulity, may have favoured the fanatical impression.

I find, on a minute inquiry of some of the connections of the family, that the whole of them embraced the idea of John's being commissioned to preach the gospel, and they accordingly initiated him in the functions of a minister, by the performance of the ceremonials of their church.

That physical something, usually stiled sympathy, which is considered as the source of compassion, which is excited into action by the sight of our fellow creatures in distress, may be susceptible of morbid influence beyond satisfactory explanation. It is well known that convulsive affections have been induced by the sight of persons labouring under them, and heroes have been known to weep at the impressive spectacles of destruction made by their own victorious arms, on the reflection, that such might be the fate of their own country, or their own friends.

The phrases, *sympathetic action*, *consent of action*, and *associated action*, are becoming familiar in medical language; but, are they not rather medical expressions used to illustrate a connection or relationship between the different parts of the system, instead of designating any peculiar law of the animal economy? We find that sympathetic or associated actions vary with the states of the system. Pestilential miasmata will at one time excite vomiting; at another time muscular debility, or languor; and, perhaps, a third time febrile action; and are frequently inefficient in producing disease of any kind, from the non-concurrence of a predisposing cause. Thus also are mental impressions varied by incidental states of the system. At some times the mere sound of death will excite horror, and at other times the devastations of pestilence are viewed

with as much indifference as if we were invulnerable. And, upon an extensive view of the dispositions and actions of mankind, it would seem as if some persons were constitutionally devoid of sympathy, and those tender affections which ennoble the character of man; or, from an unfavourable hebetude, are insensible to those impressions which frequently torture the minds of more susceptible beings. Therefore, predisposition of body, and sympathy of mind, probably deserve an equal rank in the formation of corporeal and mental diseases.

Admitting the stomach to be the centre of association in the establishment of febrile diseases, may not the *sensorium commune* be entitled the centre of association in mental disorders? The connection of the animal functions, and their general dependence on the state of the stomach, in particular, are not more evident, in my opinion, than the relation subsisting between the *sensorium commune* and the internal senses, and the dependence of the latter on the impressions made on the nervous sensorium, or common receptacle.

The immediate influence of the mind on the nervous system, and the agency of the latter in the operations of the mind upon the system, render it probable that they are concerned in the formation of that sympathetic orgasm which I suggest as the predisposition to mental disorder.

The translation of diseases from the blood-vessels to the brain and nervous system, and the transformation of febrile action to mania, also evince that physical relationship so frequently mentioned by physiologists, as connecting mind and body, and subjecting each to a participation in the morbid affections of the other. This intimate connection, however, does not invalidate the doctrine of separate orders of idiopathic disease. Fanaticism appears to be as much a primary mental disorder, as febrile action is a vascular disease.

In three cases of fever, which occurred last autumn, the transformation to mania was complete, and perfectly consonant with Dr. Rush's theory of the maniacal state of fever. In the first case a remittent form of fever became an intermittent hysteria. After a slight nervous agitation the patient would become frantic, alternately laughing and crying for several hours. The paroxysms resembled intermittent fever in the regularity of recurrence and the term of duration; and were, accordingly, removed in a few days, by the use of asafœtida and Peruvian bark in the intermissions.

A second case of remittent fever terminated on the fifth day,

in a moderate sweat; and the sixth day I pronounced my patient free from disease, and recommended a convalescent regimen. On the seventh day I was called to him again, and, to my great surprise, found him maniacal, with a feeble and frequent pulse, and cool skin. Suspecting the change to be a translation of morbid action from the vascular system to the brain, I endeavoured to relieve the latter by the application of cold water to the head for 36 hours, without any effect but an occasional shuddering sensation. Afterwards I attempted a revulsion of excitement by the application of blisters to the scalp, hands and feet, with no better success; and, finally, to excite counter action in the stomach by stimulating draughts. After remaining *in statu quo* for several days, my patient was put under the care of one of *Mesmer*'s disciples, who professed wonders, and promised no less; and with earnest wishes for his better success, and strong apprehensions of disappointment to the relatives, I submitted to the transfer: and the result confirmed my expectations.

A third case, to which I was called in the last stage of the disease, was similar in progress and termination to the preceding.

It is also worthy of remark, that the diseases of last autumn affected the brain and nervous system in an astonishing manner. The most trifling casualties sometimes produced delirium, and insanity and suicide were, throughout the country, frequent beyond example. I have sometimes queried, whether there might not have been an epidemic constitution of atmosphere, resembling the pestilential constitution of the air described by Sydenham, and believed, by many, to have existed in our country for some years past. The *maladie Anglaise* is imputed to the influence of a November atmosphere.

In consequence of Dr. Miller's reasonings on the morbid functions of the stomach, I refer these facts and observations to him; with the simple query, whether the fanaticism of the S— family be accountable for on the sympathetic connection existing between the stomach and nervous system? or whether it be not exclusively a mental affection?

I am, dear Sir,

Yours, &c.

JOHN VAUGHAN.

ARTICLE X.

FACTS *concerning the* EFFICACY *of* ALKALIES *in* DISEASES *of the* ALIMENTARY CANAL: *Communicated in a Letter from Mr.* JOSEPH BRINGHURST, *jun. of Wilmington (Delaware), to Dr.* MILLER.

IN glancing over a page of the last number of the Medical Repository, my attention was arrested by an account of accidental cures of the disease termed *bilious colic*, by means of oils and alkalies. I can furnish additional evidence of the benefit of alkalies in that disease, and in those which arise from the same cause.

In the year 1793 I was grievously afflicted by dyspepsia, and frequently attacked by violent colic. As I was particularly attentive to my diet, I informed my physician, Dr. Foulke, of Philadelphia, that I had observed those attacks of colic often followed an acid taste in my mouth, and were uniformly produced from my eating the smallest portion of pickle.—These circumstances led him to a successful mode of practice in my disease. He combined one drachm of pure pot-ash with four ounces of water and a few drops of peppermint oil; of this solution he directed me to take a tea-spoonful every ten minutes, until I obtained relief. I complied with his direction, and always found ease in a few minutes after I had taken the alkali. A friend who laboured under dyspepsia informed me that he always found bread containing pot-ash more suitable than any other for his stomach.

These facts induced me to make inquiries of persons afflicted by dyspepsia, respecting their diet and medicines. They uniformly agreed that every thing *sour* increased their sufferings; and yet some of them used the sulphuric acid as a tonic. I informed them of the success which attended my use of alkalies; and stated, to some persons, an interesting fact, as a confirmation of the great utility of alkaline draughts in dyspepsia. I had, in the year 1795, eaten two or three pears: in less than one hour I felt my stomach oppressed by a sensation of immense weight. To raise my arm appeared, to myself, a gigantic labour. Two hours had not elapsed, when I became pale, exhausted and fainty. My friends, at whose house in the country I was visiting, were much alarmed. They entreated me to take spirit, to revive my powers. I rejected their advice, and prescribed a strong dose of soot tea. Two

spoonfuls (whether tea or table spoons I do not recollect) of soot were gathered from the bottoms of the pots, and mixed with about one gill of warm water. I took the whole at one draught; and in half an hour my stomach was relieved from all sensation of weight; but I was distressed by a sense of weariness. I conjectured that my stomach had been so much harassed by the pears that it could not properly perform the work of digestion; I therefore took large draughts of warm water, and the whole contents of my stomach were discharged. When this task was accomplished, although I was weak, my feelings were pleasurable.

These circumstances almost necessarily urged me to inquiries into the qualities of alkali as a medicine, and the kinds of diseases in which it might be useful. As I am not a physician, it cannot be supposed that I should use technical terms with entire propriety; I shall therefore endeavour to avoid them in the brief account which I am about to give thee of some few instances in which I have successfully used alkalies. I should premise that I am an apothecary, and consequently all my practice has been among poor people, who could not afford to pay a physician. A poor woman, during several weeks, laboured under a fever and ague. She became so much enfeebled that she could scarcely walk. Her aspect was cadaverous. She complained of great weight about her heart, and a sense of suffocation. Peruvian bark irritated her stomach. I suspected a vitiation of the fluids of her stomach, and conjectured that acidity was the chief cause of her sensations. One quarter of an ounce of magnesia, taken daily for three days, relieved her from the weight and sense of suffocation, and then bark completed her cure. In fever and ague I always combine the alkali, vulgarly called sal. tart. with bark. One ounce of bark, and half a drachm of the alkali, frequently cure persons in two or three days.

About six weeks since, a man of this borough sent his wife with a request that I would call to see him. I complied with his desire, and found him very ill. He informed me that he had sent for me with the hope of receiving benefit from my advice. I observed, in reply, that I was not a physician, and as he was very ill, his disease required a person of more skill than myself. He urged me to prescribe for him—in truth, he almost compelled me to do so. He informed me that he had been ill for several months, and that, during the six last weeks, he had been wearing away with a violent flux. Large quantities of blood came from him two or three times daily,

and he was obliged to use the close-stool from ten to forty times during each twenty-four hours. His evacuations of blood were always preceded by intense and cutting pains in his abdomen, and sensations which impressed him with fears of his hip-bones tearing asunder. From the colour and fœtor of his evacuations, and the cutting sensations of which he complained, I suspected a daily generation of acid in his stomach and intestines, and therefore resolved to administer alkalies. I immediately combined two ounces of pure soda with 32 grains of ipecacuanha. I divided the whole into sixteen doses, and ordered the patient to take three daily. I combined the ipecacuanha with the hope that it would float on the fluids of his stomach; and after the soda had united with the acid of his stomach, and formed a purgative salt, the powder would follow it, and operate as a tonic on his stomach and intestines. —The man is now in perfect health. When he had taken one ounce of the soda thus combined, his stools were diminished in number, quantity and appearance. They began to assume a natural colour, and were free from blood. In ten days he was able to walk about, and in less than three weeks he thought himself well. I charged him to eat simple food, and avoid such meats as would oppress his stomach. He foolishly transgressed, by eating sausages fried in lard, and brought on his pains and bloody stools. Three doses of soda relieved him; and, by care in his diet, he is now in perfect health.

I have some weeks ago introduced the vaccine disease into Wilmington. I have had eighteen patients, not one of whom complained of sickness.

I am, in haste, with esteem, thy friend,

JOSEPH BRINGHURST, jun.

ARTICLE XI.

REMARKS *on Dr.* PRIESTLEY'S OBSERVATIONS *relating to the* SENSE *of* HEARING, *published in the Medical Repository, Vol.* iv. *p.* 247: *Addressed to the Editors.*

GENTLEMEN,

I PERUSED, with great pleasure and satisfaction, the observations of that ingenious and learned philosopher, Dr. Priestley, relating to the sense of hearing, published in your valuable work. I remember to have made similar ones about

two years ago, but did not attend to them at that time; and I presume that an explication can be afforded to the various phenomena he mentions to have remarked, whilst attentively listening to the beating of a watch under his pillow. He observes that, "besides the sound that we may call *ticking*, produced by the striking one piece of metal against another, *he* distinctly *heard* another sound, coincident with it, resembling that of a bell, but generally as at a considerable distance. It *was*, however, sometimes louder than that of the ticking."

This, I think, can be explained in the following manner:—When holding a watch to the ear, and listening attentively, the same sound can be heard, regularly coinciding with the beats of the watch. This, I presume, is occasioned by the striking of the teeth of the crown-wheel against the pallats fixed on the verge of the balance. These pallats are made of steel, and are very thin. This being elastic, is likely to be thrown into a small vibration by the percussion of a hard body, such as the wheel is. This *ringing* (if I may be allowed the expression) can be heard very regularly when the watch is held to the ear, and, I think highly probable, is the necessary effect of the ticking, though the additional bell-like sound is not perceptible to an inattentive observer. As there are *two* pallats, consequently there will be two additional sounds produced, though one is always louder than the other. This Dr. Priestley remarks in his third observation. But he concludes that this additional sound is *not* produced necessarily by the ticking. The reasons he adduces in support of this opinion are expressed in his fourth observation; but I think it is very probable that the interruptions of the sound that he mentions may be produced in the following manner.

It is well known to watch-makers, that it is exceedingly difficult to cut the teeth of a small wheel in a watch of even dimensions, and their distances from one another accurately equal. This unevenness of the teeth of the balance-wheel, then, will consequently produce an inequality in the motion and force of the wheel against the pallats of the balance. The pivots of the balance also may move, in a small degree, loosely in their pivot-holes, as they cannot be fitted accurately, on account of their diminutive size, without producing an unnecessary degree of friction. Hence I think it very probable that the pallats and balance-wheel may sometimes be in such a particular position, in respect to one another, that the bell-like sound may be produced in an irregular manner, being louder sometimes every other beat, and sometimes not for a consider-

able time; which circumstance Dr. Priestley expresses in his fourth observation. Two irregular sounds may be observed for the same reason. But I think there is another circumstance to be attended to in hearing these sounds, though I do not lay much stress on it. Dr. Priestley laid his watch under his pillow. The sound is generated between the pillow and bed, and conveyed through the interstices of the feathers to his ear. Now, in the attitude of listening, as the tension of the tympanum of the ear is increased, and, consequently, is more liable to be thrown into vibration by the least movement of the head, I think that the noise produced by the motion of the blood in the head will often interrupt the *regular* succession of the sounds. Of the truth of this it is in almost every person's power to satisfy himself. Besides, a person who wishes to listen attentively will often make a very slight movement of his head on the pillow, in order that he may hear the sound more perfectly. The noise produced by this motion will prevent him from hearing the beat *perfectly* for some time: and I think it probable that the medium of the communication of the sounds may be a little altered by such a movement. This will delay such a communication, and probably interrupt the sound for a short time. These circumstances, combined with those above-mentioned, may produce that irregularity of the additional sound which Dr. Priestley mentions in his fourth observation. The rest of that observation is, perhaps, merely a personal affection; I need not, therefore, say any thing concerning it.

But why (some will say) cannot this interruption of the additional sound be perceived when the watch is held to the ear? I answer that it is very possible it may take place, but the difference or irregularity of the bell-like sound may not be so great as to be then perceptible, especially to an inattentive observer: but when the watch is placed under the pillow, the sound being confined to a small space, and the medium through which it is conveyed being *denser* than before, it may become more perceptible to the ear, and any variation that may take place in the additional sound will *then* be remarked more sensibly.

In the investigation of any subject, all the circumstances appertaining to it ought to be considered. This, I hope, will serve as an apology for thus dwelling on the foregoing remarks.

The sixth observation Dr. Priestley makes, I presume, may be explained from the reasons I mentioned above, as there

may be more inequality in one watch than in another. As I know nothing of *music*, I cannot determine the harmonic proportions of the sounds Dr. Priestley heard, but I remarked that they were generally lower than that of the ticking, but sometimes much louder. I suppose the additional sound is greater in a vertical than in a horizontal watch, as in the *former* there is more force applied to the balance, and the *pallats* are constructed in a different manner.

From the foregoing observations I therefore consider the sounds above-mentioned to have originated in the construction of the watch (and Dr. Priestley's sixth observation, perhaps, proves this assertion), and not in any peculiarity in the nature or unknown quality of sound, as (if I mistake not) Dr. Priestley concludes to be the case.

The above remarks, Gentlemen, I submit, with diffidence, to your consideration; and if there are any errors in them, I hope you will not censure me unjustly, but remember that they are errors of one who is actuated by the sincerest motives for the advancement of knowledge and truth. "*Humanum est errare.*" I do not consider the foregoing to be a complete explanation of all the phenomena that are observable, but I hope the few hints above suggested will induce persons, who are far more capable than I am, to investigate this interesting subject in its fullest extent.

With respect and submission,
Gentlemen,
I remain yours, &c.

O.

Philadelphia, March 6, 1801.

P. S. The reason I did not, Gentlemen, forward this to you before, was, I expected that in your fourth number I should see an answer to Dr. Priestley's observations, written by some one of your numerous valuable correspondents; I therefore withheld it: but as I have found the contrary to be the case, I have now ventured, with diffidence, to send you the above crude remarks, which may, perhaps, suggest some hints to some of those gentlemen who correspond with you, for the investigation of the subject to which Dr. Priestley has drawn their attention.

I remain yours, &c.

July 10, 1801.

ARTICLE XII.

PRACTICAL REMARKS *on the* INTERNAL USE *of* CARBONATE *of* POT-ASH. *By Dr.* DANIEL, *of Falmouth (Virginia), in a Letter to Dr.* MITCHILL, *dated March* 29, 1802.

SIR,

I HAVE lately put to the test of practice your theory respecting morbid affections produced by septic acid generated in the intestinal canal. As the result has been highly satisfactory, I take the liberty, though a stranger, of addressing you upon the subject.

I think it necessary to premise, that, during the last summer and autumn, the inhabitants of this place, and of the country for some distance around, were nearly exempt from the usual intermitting and remitting fevers of those seasons; and this exemption extended even to those living near marshes and water courses. The only disease which engaged much of my attention was a diarrhœa of a singular kind, and that was so general that I believe there were few persons who did not suffer more or less from it during the time of its prevalence. —I shall not trouble you with a minute description of this complaint, but mention some of its most remarkable symptoms as sufficient for my present purpose. The most uniform and characteristic feature was a very white, chalky appearance of the fæces; for in not one single instance did I observe the slightest tinge of bile, but, on the contrary, a total absence of that fluid. The dejections, though frequent, were not very liquid; and my patients complained, in passing them, of a hot, smarting sensation at the end of the rectum. The febrile symptoms were seldom high, and in some cases entirely absent, though the pulse generally was stronger than would have been expected, considering the degree of languor and depression of strength which usually attended. In some instances, where the appetite became very much impaired, and the stools very frequent, they were mixed with mucus and blood; but this was not a common occurrence. I think it remarkable that most of the affected persons complained of uneasy sensations in the region of the liver; but none of their skins discovered a bilious tinge.

This disease was in very few instances fatal, but extremely obstinate and distressing. It did not end with the autumn, like the complaints of that season, but continued to show itself till the end of January; since when I have not heard of it. I was myself among the first attacked by it; and, in addition to the symptoms mentioned above, was troubled with frequent eructations of air, which diffused a very hot, keen and disagreeable sensation upon the fauces and mouth; but differing from what is usually called heartburn.

My first curative attempts upon this epidemic were very unsatisfactory indeed. I tried the whole list of remedies usually given in similar affections; such as emetics, cathartics, anodynes, bitters and astringents; but all to little purpose; the symptoms generally returning as soon as the action of the medicines was over.

My chagrin at being so often baffled in my attempts to cure a disease attended with no very formidable symptoms, excited a closer investigation of its nature; and happening to turn my attention to your letter to Dr. Percival, of Manchester, published in the first volume of the Medical Repository, my perplexity respecting its exciting cause and treatment vanished. Your reasoning proved fully to my mind, that, from the nature of its usual contents, there must be a constant disposition to the evolution of septic acid in the alimentary canal whenever the digestive powers are impaired; that nature has, in her bounty, given us a corrective of this process in the alkaline quality of the bile; but whenever this corrective is wanting, the production of that acid must, of course, be the consequence. This doctrine was certainly a happy one, when applied to the disease of which I have been speaking. My earliest observations upon the symptoms convinced me that there was a torpor in the secreting powers of the liver, and a consequent deficiency of bile; but this led me no further than to the use of bitters, &c. as substitutes for that fluid. It was reserved for you, Sir, to point out the necessity of saturating the acid poison which aggravated the symptoms and protracted the cure. As soon as this necessity was impressed upon my mind, my difficulties were at an end: for, except giving calomel occasionally, with a view of rousing the liver, I had nothing more to do than to give, during the day, frequent doses of carbonate of pot-ash dissolved in chamomile tea, and an anodyne at night. In delicate stomachs the alkali was joined with citric acid. Under this treatment the disease not only lost its obstinacy, but became a mere trifle;

and I think my acknowledgments due to you for the relief which my feelings experienced on the occasion.

Before I close this letter, I must beg leave to draw your attention to a fact which has come under my observation: It is the singular effect which opium has upon two gentlemen of my acquaintance. They are brothers, and their habits nearly the same. They have both informed me that opium, as is usual, suspends the action of their intestines for some time (never less than twenty-four hours), and then they are seized with a brisk diarrhœa, which continues from four to six hours. The fæces discharged at that time are quite white, or, to use their own words, "they resemble thickened milk, except being rather more liquid." But the most remarkable circumstance is, that the discharges are of so active a quality as to excite the most insufferable pain, and completely excoriate the anus. One of them said, "he did not think *aqua-fortis* would hurt him worse," and the pain had often been so great as to bring out a clammy sweat upon his skin and induce faintness.

In attempting an explanation of this phenomenon, I have supposed the opium to possess, in those two persons, a specific power of suspending, for a time, not only digestion, but also the secretion and transmission of bile to the stomach and intestines; that, during this suspension, a considerable accumulation of septic acid takes place, and excites a commotion in the intestines, which does not cease until they are emptied; or the liver shakes off its torpor, and throws in the necessary quantity of bile to correct the acid.

To put this reasoning, in some measure, to the test of experiment, I prevailed upon one of the gentlemen to submit to the effects of a dose of opium under my directions. Early in the evening I gave him a dose of a solution of sal absinthii, and at bed time I gave him another, with a grain of pure opium. He repeated the doses of the solution several times during the fore part of the ensuing day, and in the afternoon it stimulated his bowels to gentle action. The stools were not quite so white as they had formerly been after taking opium, and entirely destitute of their sharp, corroding quality.

I think it would be superfluous to offer any opinion upon this experiment, as the result appears to me to speak plainly for itself.

I believed the above facts to be corroborative of your theory,

and have therefore troubled you with them, and I should feel honoured in hearing that you concurred in that belief.

I am, with profound respect and consideration,
Your obedient servant,
JOHN MONCURE DANIEL.

P. S. I am inclined to think that the torpor of the liver mentioned above, as attending our late epidemic, was a very general thing, though I can ascribe it to no particular cause. I do not at present recollect, in the whole of my practice last summer and autumn, to have met with more than two cases of sickness attended with a redundance of bile, and they were among the few who escaped the prevailing bowel-complaint.

J. M. D.

REVIEW.

ART. I. *Physical Investigations and Deductions, from Medical and Surgical Facts; relative to the Causes, Nature and Remedies of the Diseases of a warm and vitiated Atmosphere, from Climate, Local Situation, or Season of the Year: together with an Historical Introduction to Physianthropy, or the Experimental Philosophy of Human Life; that of Diseases, and also of Remedies. By* William Barnwell, *M. D. formerly Surgeon in the Employ of the Hon. East-India Company of London.* 8vo. pp. 459. *Philadelphia.* Woodward. 1802.

WHEN men of talents and experience condescend to record the facts which they have witnessed, or to write the details of events in which they have been actors, their narratives are entitled to more than a common share of regard. If, on submitting their works to the public eye, an opinion should be entertained, by those who peruse them, that the authors were good and discriminating observers, and related what they knew with truth and candour, it seldom fails that respect and honour are attached to their names. They who enlarge the dominions of Science, and make their acquirements tend to lessen the physical ills, and improve the moral excellence of the human race, are reformers indeed.

The volume now before us was announced, our readers remember, in page 238 of this volume. The writer, who has journied much by land and by water, and visited the four quarters of the globe, has taken the pains of arranging his observations, and submitting them to examination in print. During twenty years of his life, devoted to study and practice, he has been employed in gathering the materials. These have been principally derived from warm and unhealthy regions. And the objects in contemplation were promotion of science and benefit to mankind.

The book contains several essays or disquisitions on physical and medical subjects. Though these are in some respects analogous, there is little direct connection between them. Each is so much an entire performance, that it might have been transposed from the place it occupies to another part of the volume without detriment. Or each of the great divisions

might have made a distinct publication or pamphlet by itself. It appears to us judicious that Dr. B. has embodied them in one cover, and offered them in that collected form.

The principal heads under which the materials are arranged, are, 1. Physical Geography, reaching to the 53d page. 2. Medical Topography, extending to the 95th. 3. The Nature of Infection, spreading to the 119th. 4. Analogies of Medical Surgery, occupying all the pages to the 165th. 5. Then follows a Dissertation on Bilious Affections and Diseases of the Liver, which ends at the 245th page. 6. And after this a Treatise on Diseases of the first Passages, Choleras, Diarrhœas and Dysenteries, which terminates at the 300th. 7. An History of periodical and continued Fevers, under the Denominations of Intermittent, Remittent, Typhous and Pestilential, to the 399th inclusive. 8. An Historical Introduction to Physianthropy runs to the 457th. And, 9. The two last pages are entitled, the Physical Principles of Medical Science, &c. and a Synopsis of the Genera and Species of the principal Diseases of the Human Body. Such are the leading titles of the articles contained in Dr. B.'s volume.

But it is our business to examine these pieces a little more nearly. We shall take them in the order which they hold in the book. And here the specimen of physical geography presents itself first to our review.

After a few pages of introductory remarks, the author proceeds to an investigation of the causes of the remarkable difference which exists between the temperatures of the United States of America, and the corresponding parallels of latitude in Europe. In doing this he has brought together a great number of facts: he has disposed them in an interesting manner, and given a striking and enlarged view of the currents in the Atlantic Ocean; how they are influenced by winds; how, in their turn, they operate upon the atmosphere, and by this means affect the temperature of the land, whether continent or island, in their neighbourhood. We were pleased to see him give full credit to Dr. Williamson and the Abbè Mann, for their labours and researches on this subject. A partial difference with them in opinion is stated; but this is done in the most liberal and respectful manner; and the reasons and considerations on which it is founded are delivered in impressive terms. This will appear from the following extract, which seems to us a favourable specimen of Dr. B.'s explanation of the great movements of atmosphere and ocean between the western and eastern hemispheres. (p. 32.)

"We come again to take a view of the currents in the northern parts of the ocean—their causes and effects on the temperature of different countries; but in the first place we must recapitulate those currents caused by the trade winds, and their effects in various places. These winds, prevailing all round the globe, cause currents in the ocean, which *extends* [extend], as we have shewn, in many parts, far beyond the limits of the winds; for they prevail near many coasts where the trade wind never reaches, both to the southward and northward. Now, in consequence of the winds in the Indian Ocean, there is a constant current sets past the Cape of Good-Hope, and the southern parts of Africa, from east to west; for the trade winds in the Pacific Ocean *sets* [set] the surface of it in motion to the westward; so that, between the southern part of the continent of Asia, and the main land of New-Holland, there is a constant current sets to the westward through the eastern islands; but it is stronger, both here and on the southern part of Africa, at some times of the year than at others; but never prevails in the opposite direction from west to east; but from India towards Africa there is always a slow current within the limits of the trade winds; and at the Cape it often runs rapidly, even against strong storms from the westward; for in this direction we have been carried past the Cape, at the rate of two miles an hour, against the wind, when lying to, which is a clear proof of the force of the steady trade winds against uncertain storms, &c.

"From the Cape towards the island of St. Helena there is always a current, which is one reason why that island is often past, or overshot in the night. By this course the waters of the Indian Ocean find their way into the Atlantic; but the trade wind prevailing here also, sets the waters of the Atlantic in motion to the westward; or from the coasts of Africa towards America, where being intercepted in their course, that part which is to the southward of Cape St. Augustine, in Brasil, about the ninth degree of south latitude, is divided by this most eastern part of America; that part which is to the south of this takes its course southwardly, along the eastern coast of South-America, all along which it has been traced, and even through the Straits of Magellan, and into the South-Sea, and probably past Cape Horn. But that part of the current of the Atlantic which is northward of Cape St. Augustine, is totally intercepted by the American continent; and, by the direction in which the continent is, the current takes its course towards the Gulf of Mexico, where it is in

a manner dammed up by the continent of North-America stopping its progress to the north-west, and the trade wind behind forcing it forward. Here we may observe that there can be no doubt but the water of the gulf is several yards higher than that of the South-Sea, and that the water of the Red-Sea is also higher than that of the Mediterranean, upon similar principles; the water being forced in that direction from the east. But this was a prevailing opinion in very ancient times.

"The direction of the western coast of Africa would seem to direct the current of the Atlantic towards the Gulf of Mexico also; where being pent up, it has no other way left to escape but past Cape Florida, between which and the island of Cuba it forces its way; and having passed this Cape, it bends its course to the northward, between Florida and the Bahama islands; from whence it stands on to the northward, along the southern parts of the United States; from whence it takes a north-east direction, until it vanishes about lat. 42 deg. N. towards the banks of Newfoundland: there is no doubt but it is a very great cause of the fogs which prevail on these banks, together with the cold air which it commonly meets with here; as also another current which sets southwardly, along the coasts of Greenland and Labradore, from Davis's and Hudson's Straits, &c. and both will certainly cooperate in causing the uncommon fogs met with here. These two currents intercepting each other, are supposed, with great probability, to accumulate the subsistence for the immense numbers of fish which are found here, in the same manner as banks are formed; and large quantities of fish are found at the mouths of all great rivers, where their currents are intercepted by the sea, &c.

"Although the Gulf Stream runs in some of its most rapid parts, between the Bahama islands and Florida, between two and three miles an hour, to the northward of that strait it runs slower, and spreads wider, to about 40 or 50 miles. It is very evident that this water, forcing its way from a warm to a colder climate, will carry much of its heat with it into the colder parts of the Atlantic, as has been satisfactorily proved by Dr. Blagden; and although a part of it which is most southwardly, and in which that substance called the gulf-weed floats, returns again to the southward, and performs a circular course back again into the gulf; yet the far greatest part of it takes a different course, and is driven by the west winds towards the northern coasts of Europe; for there are

seeds of vegetables found yearly on the western islands of Scotland and Ireland, which are produced in the West-Indies alone; which is a convincing proof that the waters of the Gulf Stream also take their course in that direction; and we shall find that they have a great share in moderating the coldness of the European winters, but particularly in preserving the mild temperature of the northern parts of the Atlantic, which is clear of ice upwards of 10 deg. farther towards the pole than any other ocean or sea in the world; for here are two phenomena with which we are acquainted, not found in any other part of the world—the Gulf Stream, and the mild temperature of the Atlantic: for we shall find, on investigation, that a current sets to the northward, along the western coasts of Ireland and Britain, towards Norway and the North Cape, and by this means preserves the warmth of these seas; so that Europe is under many more obligations to America for her mild winters than it was formerly thought she was, particularly to the isthmus of Panama. But how it happens that the gulf-weed should so universally take its way to the southward, is another consideration. It may be impelled by a law of the motions of substances floating on water, similar to that which we often see take place in rivers, or other streams of water, wherein the lighter floating substances are collected together: but, however it is brought about, it is certain that the Gulf Stream, aided by another circumstance which we are to mention presently, is the cause of the temperature of the north-east part of the Atlantic being so very mild above all other seas in similar latitudes. This is a *phenomena* [phenomenon] which has scarce ever been attempted to be explained; but we have no doubt but this explication will prove satisfactory; for although cultivation has been allowed to make the temperature of the land milder in Europe, yet that was never even suggested to extend its influence far into the ocean.

"The Atlantic, we see, keeps broad and bold, quite away to the north pole perhaps, or to eighty-one, as it has been explored so far by the whale fishers; whereas the Pacific Ocean is contracted at about 66 deg. north, to a narrow strait of fourteen leagues between the continents of Asia and America. Now let us begin our course with the west winds in the Atlantic, where these winds are rendered mild by passing over this great body of fluid water, and receiving part of its heat, from the agitation which it causes in the ocean, for it comes upon the British isles as mild as it left the great ocean; so

that they have the mildest winters of any, and next the continent of Europe, which is so mild as to be habitable to neat 70 deg. north, and fertile countries, and populous, with large cities to above 60 deg. This must be from its vicinity to the western breezes of the Atlantic. Now these winds hold on their course to Siberia, and all that northern country of Tartary. But China being on the very eastern side of the old continent, the west winds must pass all over the continent of Europe and Asia before they can reach it, and are, therefore, much cooled by the frozen regions of great extent over which they pass, as this is the greatest body of land in the world; of course the rigour must be increased in proportion, from the causes we have already mentioned, and therefore the east side of the old continent is so very cold as to be scarce habitable to 50 deg. north. As the countries to the northward of Corea and Kamschatka, and all along the east side of the continent, are as cold in the winter as it is in similar latitudes in the eastern side of the new continent, and somewhat more so; for the empire of China is much colder than the same latitudes in the United States of America. At the city of Pekin, the cold of their winters *are* [is] greater than *these* [that] of Philadelphia; and so likewise are the heats of their summers greater at Pekin; so that both extremes are greater. In the same parallel the colds and heats are both greater where they may be less influenced by the sea and its temperature, in the interior parts of the old continent. The winters are as cold at Canton, lat. 23 deg. 20 min. as at Charleston, lat. 32, 45."

The parallel between the shape and exposure of the south-eastern coast of China, and that of the United States, is well worthy of notice. And this is the more deserving of attention, as the similitude has been seen and felt by a man who, having repeatedly visited the former, is now an inhabitant of the latter of these countries. We wish for more such *specimens of physical Geography;* and, in addition to the author's remarks on the trade winds, eddies and currents, we have endeavoured to contribute our mite, by stating the facts which show the origin and progress of a north-easterly snow-storm on the Atlantic coast of America. These remarkable phenomena have an intimate connection with, and dependence upon, the principles he has laid down. (See Medical and Philosophical News, title *North-Easterly Snow-Storm.*) The distribution of heat and cold through our atmosphere is but imperfectly understood. By collections of such facts as the au-

thor has presented to us, shall we be enabled eventually to explain, with correctness, the vicissitudes of climate and season, and give a philosophical theory of the winds.

The "Sketches of Medical Topography" bear indication of an observing and attentive mind. They contain the result of observations made in various places. The author has carefully examined many spots which he has visited, with a view to their salubrity or sickliness. And, in general, he shows himself well acquainted with the opinions of philosophy and the discoveries of science. We were, therefore, rather surprised to find him differing from Hippocrates, by affirming that, for the purposes of *drinking* (p. 59) as well as cookery, the wholesomeness of the place makes very little difference with respect to the water. This appears to us to be an oversight; for water of a bad or vitiated quality can scarcely be conceived innoxious. We extract, as examples of Dr. B.'s talent at this kind of delineation, his accounts of several places in Virginia and the Southern States, that our readers there may see and examine them. (p. 69.)

"Sir John Pringle found the health of the army in the Netherlands to be in proportion to the depth of the water under the surface of the earth, which he measured by the depth at which it stood in the wells: but there are many very unhealthy situations, in which there is no stagnant water to be found; we shall mention, as one instance of this, Petersburgh in Virginia. This has always been noted for an unhealthy situation; yet here we could not discover any sufficient cause for this, either in the town or its neighbourhood, if we except only a small piece of banked meadow, of less than two acres, about half a mile from the town, on the river towards Blandford. Along the river side, between it and the town, there is a plain of two or three hundred yards over, which was said to be formerly marshy; but which, when we visited it in the year 1798, was covered two or three feet deep with sand, by an inundation of the river some years before—a very happy circumstance for this town, as it appeared afterwards: for this accident was said to have rendered the place much healthier than formerly. The opposite side of the river to the northward is all high land, and the south side, on which the town stands, rises in different stages, and there is a gradual ascent for about three miles to the south-west; so that the town, although partly elevated from the river, is rather in a valley with respect to the country. The river, or rather the creek of Apomatax, is scarce an hundred yards

over—in some places not as many feet—and at the upper part of the town it is contracted between two rocks scarce ten yards apart. The whole country, in every direction, is elevated and dry, *unless* [except] some very small spaces down the river, along its banks, towards its junction with James's River. But the whole country is high, hilly, and broken, much more so than we could form any idea of, from any description extant.

"Richmond also stands on high, broken ground. On the north side of the falls of James's River it is accounted healthy for the country in which it is. The lower part of this country, about Norfolk, is an uniform plain, intersected with rivers and creeks of tide-water. It is generally covered with pine woods, with some plantations interspersed. The whole country is universally unhealthy; *unless* [except that] on the shores of the sea, the bay and large rivers, it is considerably better than farther inland; but even the rivers are far from being healthy: the open shores of the sea and bay are more so. Hereabout all animal nature appears to decline. Had the Abbè Raynal taken his information relative to America from this part of the country, he would not have been in much of an error. Here the rabbits are not larger than rats, and black cattle do not attain one half the size which is common in other places; and the inhabitants show the visible effects of a pernicious atmosphere, especially after twenty-five years of age. A thin, sallow appearance is more common hereabout than we have ever observed it in any other part of the world, even in the hottest climates; and they are commonly tormented with agues one half the year, and scarcely ever get clear of the appearance of them. In this respect the town is more exempt from sickness than the country; but here they have the infection of the pestilential or yellow fever every two or three years, which, although it spares the natives, and most of those who have resided there two or three years, it is very mortal to all strangers from northern or healthier situations; even those from Petersburgh or Richmond, Williamsburgh or York, commonly suffer here in the autumn. The soil hereabout is uniformly a sterile, loamy clay, with a small mixture of fine sand, and no gravel or stones of an ounce weight within many miles. By this means, whatever rain-water falls on the ground lies until it is evaporated, for there are no declivities, unless on the banks of creeks, to convey it off; and the earth is of a nature too compact to absorb it. By this means it soon becomes impregnated with vegetable matters, and by the intense

heat of the sun, exhalations of a most pernicious nature are extricated; by which the whole atmosphere is adulterated, particularly when the wind is from the south to the south-west; for in this direction it passes over a large extent of such low ground as this described, but particularly the great dismal swamp, which is in some parts only five or six miles distant; and the air which comes in that direction, in warm, sultry weather, such as it very generally brings with it, is by far the most disagreeably suffocating and pernicious that we have ever experienced in any part of the world, even in Sumatra or Java. It appears to many an inexplicable mystery, why the stationary inhabitants of this town are so generally exempt from the infection of the pestilential fever of the fall season, when, at the same time, it rages so violently among strangers; but any one who makes a comparison of these people, and their local situation, with those of other places further north, we are persuaded will find no difficulty in the matter. It is certainly to be explained on the same principles by which it has been found, that the healthy and robust inhabitants of northern countries are more subject to this disease, and generally worse under it, than the inhabitants of warm and unhealthy countries are. In Charleston it has always been remarked, that those who have lately arrived there from the northern States suffer most by this disease when it has raged there: and in the West-Indies it is the armies and fleets, and other lately arrived strangers, who suffer most by it; and in this there is certainly nothing abstruse; but the great source of error arose from confounding the pestilential fever with the common remittents, between which there are very great and obvious differences, both in their nature and appropriate treatment."

It has always appeared to us, that an exact account of the *mineralogical* constitution of the soil was necessary to enable us to comprehend the condition of the incumbent atmosphere. From a knowledge of the strata only, in any given situation or region, can a correct judgment be formed what there is therein or thereon, either to evolve pestilential gases, or to neutralize them. At this period of analysis, we expect a distinct account of every thing lying on the ground, or making a part of it, which can, by solar or other heat, be turned into air or elastic vapour. The author has observed, with great propriety (p. 56), the influence of heat in dissolving substances and suspending them in the air, and the joint aid afforded by putrefaction. If heat thus contributes to turn

substances to vapour, and corrupting animals and plants are the most common of these, how happens it that the intelligent author has written so little of the constitution of the layers of earth, whether argillaceous, silicious, or calcareous? and of the superficial stratum or upper covering of these, formed of the wrecks of organized and but lately animated matter?

(To be continued.)

ART. II. *The Medical Assistant, or Jamaica Practice of Physic; designed chiefly for the Use of Families and Plantations. By* Thomas Dancer, *M. D. late Physician to the Bath, and Island Botanist.* 4to. pp. 384. *Kingston (Jamaica.)* Aikman. 1801.

MEDICINE has been so much indebted to physicians of the West-Indies for many valuable publications, that we perused the work now under examination with uncommon interest. Our eagerness to become better acquainted with the diseases of tropical regions, whose history is comparatively modern and imperfect, arises not only from their importance in relation to the enterprises of agriculture, commerce and war, but also, in a great degree, from the bold and decisive features they assume, by which they are calculated to arrest attention, and to throw light upon the whole circle of medical principles. The labourers in this field need not apprehend that it is too narrow for all the exertions they are able to make. The countries which are incessantly hurrying to the grave such a multitude of sea-faring, trading and military adventurers from other parts of the world, will be interesting objects of consideration to physicians and the public, whether animated by the love of science, the zeal of humanity, or the pursuits of gain.

In the introductory part of this work, which occupies fifty-eight pages, the author undertakes to give a brief sketch of the structure and economy of the human body; an account of the different constitutions of men, arising from temperament, age, sex, climate and habit; a view of the effects of air, exercise, aliment, sleep, repletion, evacuation, &c. and an exhibition of some general pathological and therapeutical principles.

In the next division of the work, which forms the main body of it, and extends to the 322d page, the author treats of fevers as they appear in Jamaica; of bowel complaints; of inflammatory diseases; of hæmorrhages, or discharges of blood;

of catarrhal disorders, consumption, &c. of contagious eruptive disorders; of dropsies, cachexiæ, dirt-eating, &c. of nervous diseases; of cutaneous and ulcerous complaints; of sundry local and anomalous complaints; of the diseases of women and children; of diseases requiring chirurgical treatment; and of casualties.

In an appendix we find a collection of forms or receipts for making up the medicines recommended in the work; a catalogue of such medicines, in their requisite quantities, as are more especially necessary to be kept in families and on plantations; a table of weights, measures, doses of medicines, &c. an account of all the simples of the country whose virtues and uses are known, with the manner of exhibiting them, their doses, &c. an index of diseases, with the simples suited thereto; an alphabetical index of the simples of which an account is given; and a general index to the whole work.

As this work is intended to be chiefly popular, the author has endeavoured to adapt himself, as much as possible, to the capacity of general readers; but, in treating of scientific subjects, it is difficult to lay aside the use of scientific terms. These, therefore, are sometimes unavoidably employed, and are generally explained.

We give the following account of the design and tendency of this publication in the words of Dr. D. extracted from the preface. He judges that it will be found useful, "not only in the hands of those for whom it was primarily intended, viz. those who have families, or who are entrusted with the charge of negroes, and who are frequently at a loss for medical assistance, but in some measure so to medical men; at least to such as are newly arrived in the island, and to those engaged in country practice, who have, in some situations, but little access to books, and less opportunities for reading.

"The author is well aware of the objections it is liable to, from those who think all attempts to render medicine a popular study, nugatory and futile; but he dissents from this opinion. They may not, indeed, be calculated to answer fully the purposes intended, but they are, nevertheless, useful in a great degree, and might, perhaps, be made much more so, were they not decried, and if they were undertaken, not by empirics, but by men of science and ability. Not to mention the necessity of such works for people who *will meddle in physic*, who will take upon themselves the cure of diseases, however ignorant and unqualified; they are certainly requisite for others, who are reluctantly compelled to this office from

circumstances of necessity. Where medical assistance is not at hand, or cannot be afforded, which is not unfrequently the case, something must be done for the relief of pain and the prevention of danger. A suffering mortal is not to be abandoned, or consigned to misery and death, without any attempts being made by those about him, for affording him relief, because they happen not to be medical men, or have not had opportunities of studying physic regularly. Such a knowledge of diseases and their treatment as will enable a man to be, on many occasions, useful to himself and others, may certainly be acquired without a regular and scientific course of study. A book, therefore, like the present one, that may serve as a guide to persons in this situation; that, besides giving general notices concerning health and disease, teaches, in a plain and familiar manner, how to distinguish and treat the prevalent diseases of the climate, it is presumed, cannot but prove useful and acceptable, particularly considering that there is no preceding work of the kind. As to works of a similar nature in Europe, the author has to observe, that whatever may be their respective merits, or however useful they may be found in that part of the world, they are not so well suited to this and other tropical climates, where diseases put on a different aspect and character; where they commonly run a shorter course, and have a more fatal tendency; consequently requiring a treatment very different from that made use of in the same diseases elsewhere."

The following extract of Dr. D.'s account of *Malacia Africanorum*, or the disease of *dirt-eating* among negroes, is presented to our readers:

"The disease of dirt-eating among negroes is precisely the chlorosis or green sickness of women, which Dr. *Cullen*, our best nosologist, thus defines: "Indigestion, or an appetite for substances not eatable; pale colour; œdematous or dropsical swelling; general weakness; palpitation of the heart; obstruction of the menses." The afore-mentioned writer considers chlorosis as peculiar to women, and depending wholly on a retardation or obstruction of the menses; but other authors describe a disease called *Pica* or *Malacia*, in all respects similar, occurring in the male sex, but more particularly among boys.—A late observant traveller (Sonini) affirms, that dirt-eating is peculiar to Africa, and that it affects persons from other countries going to reside there.

"The negroes who eat dirt complain, first of pain in the stomach (whence the French call it the *Mal d'Estomac)*

then breathlessness on the least motion, attended with visible pulsation of the carotids, or the arteries of the neck; they next become bloated; their nails and the palms of their hands become white, and their lips, gums, &c. quite pallid, showing the want of red globules in the blood. These symptoms continuing and increasing, the patient sooner or later dies; sometimes in a very short space of time; at others, through the aid of medicine and nourishment, his fate may be protracted, but he rarely recovers.

"*Treatment.*—The symptoms arising from dirt-eating being exactly the same as in chlorosis, or green sickness, the same remedies have been usually employed, viz. emetics, purgatives, bitters, chalybeates, &c. with a suitable regimen of animal food, &c. which are now and then successful; but when a great number of negroes take to this practice at the same time, the disease is not to be overcome by any remedies yet known. The depriving them of dirt will not obviate the danger, for they appear to suffer as much from the prohibition as from the indulgence.

"In the first place, the strictest inquiry is to be set on foot, to discover the motive that has impelled them to this practice. If they have any reasonable pretext of complaint, their wrongs should be redressed, and their minds conciliated; but neither reparation for supposed injuries, nor any indulgence that can be shown them, will always have the effect of making them desist.

"The disease is characterized by a great degree of torpor. There is the same want of excitement as in jaundice, dropsy, &c. where the liver is affected, and where the stimulus of bile in the first passages is deficient. The dissections in the complaint have been few, and I do not know what grounds there may be for supposing the liver concerned, either in occasioning the disease, or in hindering recovery; but, reasoning from analogy (a loose one perhaps), I have thought that mercurial frictions might be tried, for the purpose of exciting the action of the absorbent system, as in the afore-mentioned complaints, or as a stimulus to the sanguiferous system. Experience, falsifying the notions formerly entertained of the effects of mercury, has shown, that it is a most efficacious remedy in many diseases, where the administration of it, some time ago, would have been thought highly pernicious, if not fatal. The experiment, I think, then, would be a justifiable one."*

* "Since writing the above, I have met with an observation that is quite apposite to this subject. 'Every disease (says Dr. Wade) originating from

We expected to find in this work a more explicit account of the yellow fever, particularly with respect to its origin and causes, as well as the most established mode of treatment. This subject has been much discussed in the island of Jamaica, and we had hoped that the minds of medical men, from the extent of observation and experience existing there, had arrived to a greater uniformity in opinion and practice.

From the diligent and learned research which Dr. D. exhibits in this work, we doubt not it will be considered by the physicians, and by the community in Jamaica, as a judicious and useful addition to the stock of practical publications.

ART. III. *Collections for an Essay towards a Materia Medica of the United States. By* Benjamin Smith Barton, *M. D. &c. Part 1st. The second Edition.* 8vo. pp. 64. *Philadelphia.* Carr. 1801.

OUR readers will remember, that in vol. ii. p. 72, of our work, we gave an account of the first edition of this publication. This second edition is improved by the addition of a number of notes at the bottom of the page. The appendix is also considerably enlarged, by many practical observations, not found in the original work, on the virtues and uses of several important medicinal plants.

The following is the result of the author's recent experience in relation to a plant which has been long known to possess very active qualities.

" *Datura Stramonium.* Since the publication of the first edition of my *Collections*, I have had many opportunities of employing this medicine. I have used it chiefly in the form of an extract, prepared from the fresh leaves. I have principally exhibited it in cases of mania and epilepsy. I cannot

the liver, is cured by mercury and laxatives; so that, in obstinate cases, which have the remotest connection with this organ, mercury ought to be tried.'—*Wade on the Diseases of Seamen in Bengal.*

" Several country practitioners, to whom I have suggested this mode, from the ideas they have formed of its probable success, have determined to make trial of it. In the only case in which I have had the opportunity of making the experiment, it answered the purpose. The patient, who was universally bloated, and proved to be a dirt-eater, after a vomit, and dose of the sacred tincture, had two drachms of mercurial ointment rubbed in daily, till his mouth was affected, which did not happen till he had used four ounces of the strong mercurial ointment; he then took bitters and chalybeates—was allowed good nourishment, and some wine—and, in a few weeks, was relieved of all the symptoms."

hesitate to say that it is a medicine of great and invaluable powers. It is my intention to publish the particulars of the cases in which I have employed this medicine in a separate work. I shall, therefore, content myself, in this place, with observing, that I have found the stramonium especially beneficial in cases of mania attended with little or no fever, or with a cold skin and languid circulation. I have thought it necessary to give the medicine in very large doses. Beginning with a few grains, the dose is gradually increased; and in a few days it may, with safety, be taken to the extent of fifteen or twenty grains. In one case of mania I at length gave it to the extent of sixty grains at a dose. When the patient had continued upon this dose for some time, she broke out into biles upon various parts of the body, and was, at length, discharged from the hospital perfectly cured. In several other cases of mania the datura has been of essential use. Except in one case, I have not perceived any inconvenience from it. In this case, whilst the patient was taking the medicine to the extent of thirty grains, it produced a very enlarged dilatation of the pupil of the left eye, and a palsy of the palpebra of the same eye. But even this was only a temporary inconvenience, which was removed, in a very short time, by the application of a blister. The patient resumed the use of the extract, and was finally discharged from the hospital apparently cured.

"The beneficial effects of the stramonium, in cases of epilepsy, have been likewise very manifest. In a case of epilepsy, accompanied, at various periods, with fever, the medicine seemed to increase the sense of fulness in the head, and other disagreeable symptoms. But, in several other cases, I exhibited it with the most manifest advantage. Although in no case have I been able to effect a cure with the stramonium, I have certainly administered it with the effect of protracting the fits, and of diminishing their violence. Perhaps much more than this cannot be said, with a strict regard to caution, of any other of the many medicines which have been recommended for the cure of epilepsy.

"I have been informed, that in the State of Kentucky the seeds of the stramonium are sometimes exhibited, with advantage, in cases of chronic rheumatism. On this subject I cannot say any thing from my own experience. The seeds of this vegetable are unquestionably endued with very active powers. This is abundantly evident from the pernicious effects which are so frequently observed in children who have

swallowed the seeds. Dr. John Archer, of Maryland, has found them of much advantage in cases of epilepsy. I have used them with seeming benefit, in a case of mania."

We also present the author's observations on the following articles of the class of anthelmintics.

"*Spigelia Marilandica.* In some parts of Carolina, &c. this invaluable plant is known, among other appellations, by the name of snake-root. It is the *unsteetla* of the Cherokee Indians. Every part of the plant is possessed of the anthelmintic property, and accordingly, in Carolina, the physicians employ the whole plant—chiefly in decoction. But the active power unquestionably resides more especially in the roots. It is the opinion of many persons, that the deleterious effects which occasionally occur from using this vegetable do not arise from any pernicious property inherent in the spigelia, but from the root of a distinct plant which is often mixed with the spigelia. I do not think this notion is entitled to any serious attention. The spigelia is, without doubt, a poisonous and narcotic vegetable. It is, in all probability, by virtue of this poisonous quality, that it proves so beneficial in cases of worms. I am acquainted with a very intelligent physician, who, in the exhibition of the spigelia, always deems it necessary, or proper, to persevere in the use of the medicine until it produces some very decided effect upon the brain. I must confess, however, that I have often found it completely efficacious, without observing that it has occasioned the least inconvenience to the system. That it has sometimes done mischief, will not, I believe, be denied. Professor Bergius informs us, that he has known instances of convulsions cured by the spigelia, although no worms were expelled by it. Dr. Garden, speaking of this plant, says, 'It especially answers in continued or remitting low worm-fevers, in which I use its decoction, adding a small proportion of the root of the serpentaria virgin. Its effects in abating the feverish exacerbations are so considerable, that in these I consider it as the most powerful sedative. It is an excellent attenuant.' I have been induced to take notice, in this place, of the observations of Bergius and Garden, because a pretty extensive use of the spigelia has now convinced me that this medicine very often affords relief, and, indeed, effects a cure, in cases in which worms are supposed to be present, but in which none are discharged. If I do not greatly mistake, this will be found an highly useful medicine in some of the febrile diseases of children, unaccompanied by worms, especially in the insidious

remittent, which so frequently lays the foundation of dropsy of the brain."

"*Common Tobacco.* There is a peculiar mode of employing the leaves of the tobacco in cases of worms, which I cannot avoid mentioning in this place, especially as it has, in many instances, produced very happy effects. The leaves are pounded with vinegar, and applied, in the shape of a poultice, to the region of the stomach, or other part of the abdomen. In consequence of this application, worms are often discharged, after powerful anthelmintics have been exhibited internally in vain. We ought not to be surprised at this effect of the tobacco, since we know that the same vegetable, applied externally, is often very efficacious in inducing vomiting. Accordingly, I have, for some years, been in the habit of applying tobacco leaves to the region of the stomach of persons who have swallowed large quantities of opium, and other similar articles, with the view to destroy themselves. It is well known, that in these cases the stomach is often extremely inirritable, insomuch that the most powerful emetics have little effect in rousing that organ into action. Here, as an auxiliary at least, the tobacco, used in the manner I have mentioned, is certainly very useful, and, in many instances, ought not to be neglected."

"*Melia Azedarach.** When I published the first edition of my *Collections*, I had not *any* experience in the use of this vegetable. Since that period, however, I have used it in several cases of worms, and always with advantage. Indeed, I am inclined to think that the character of this new anthelmintic has not been too highly drawn. I will not assert that it ought to be preferred to the spigelia; for I have had much more to do with this than with the melia. The melia is unquestionably a valuable anthelmintic, and ought to be introduced into general practice. I have employed the bark of the root, both in substance, and in the shape of a saturated decoction. In the case of an adult, who took the decoction in large quantities, *with the effect of discharging great numbers of worms*, it seemed to occasion some confusion of the head, and trembling of the hands. These, perhaps, were accidental symptoms; but I am disposed, with the patient, to ascribe them to the medicine. The worm-cases in which I have found the melia useful, were cases of the common round worm, or lumbricus intestinalis. I have not had any opportunity of trying how far it is a remedy against the tænia,

* Pride of India, called in South-Carolina poison-berry-tree and China-tree.

or tape-worm. But I am informed that, in Carolina, it has been used with the effect of discharging great numbers of this species of worm. Should this prove to be the case, the melia will be doubly entitled to our attention as an article of the materia medica. It is not merely in cases of worms that this vegetable has been found useful. Mr. Andrew Michaux, an intrepid French botanist, informed me, that in Persia, where this tree grows spontaneously, the pulp which invests the stone of the fruit is pounded with tallow, and used as an 'antipsoric,' in cases of tinea capitis in children.

"Is the melia a narcotic or poisonous vegetable? Its remarkable effects in destroying and dislodging worms renders this probable, but not certain: for many articles which, with respect to the human body, are entirely innocent, are known to be noxious to intestinal worms, and many other animals. Such is sugar, as has been demonstrated by the experiments of Redi, Carminati, and other writers. The case which I have alluded to renders the deleterious quality of this vegetable very probable. I may add, that in some parts of Carolina the root is deemed poisonous. Horses and horned cattle, however, eat, with impunity, the leaves and berries. Certain species of birds (particularly the turdus migratorius, or robin, and the turdus polyglottos, or mocking-bird) devour the berries in such large quantities, that, after eating of them, they are observed to fall down, and are readily taken. Does not this circumstance render it probable that the berries contain an intoxicating quality? This, however, I believe, is not the general opinion of the inhabitants of Carolina, who ascribe the condition of the birds merely to the circumstance of their having eaten so abundantly of the berries, that they injure entirely by distention. The ripe berries have a sweetish, but nauseous taste.

"As the melia is now completely naturalized to the States of Carolina and Georgia, it may not be amiss to close this article by observing, that the fruit of this vegetable is employed in Japan for furnishing an expressed oil, which grows hard like tallow, and is used for making candles. May not our fellow citizens to the south render it worth their attention to follow the example of the Japanese, in the instance I have mentioned?"

It gives us great pleasure to find that the learned author intends to publish an additional volume relative to other indigenous medicinal productions of the United States, and that he has made such progress as already to be in possession of sufficient materials.

ART. IV. *Notes and Observations on the Pine-Lands of Georgia; showing the Advantages they possess, particularly in the Culture of Cotton, &c. To which is added, a Geographical Sketch of the State of Georgia, with a Comparative View of the Population of* 1791 *and* 1801, *and the Exports of the Years* 1791 *and* 1800. *By* George Sibbald, *of Augusta.* 8vo. pp. 71. *Augusta.* Bunce. 1801.

TO show that the *pine-lands*, called in Georgia *pine-barrens*, are highly proper for the cultivation of cotton, is a favourite object of the author. Their moderate price, the ease of clearing, and the good crop they yield, are substantial recommendations to the emigrant and new settler. Mr. S. is a zealous friend of the cultivation of cotton; he owns himself interested in inviting people to come and embark in it; and he declares that he never misrepresents facts, or departs from the truth. It is another great object with him to promote the consumption of cotton. For this purpose, besides the common articles manufactured from it, he recommends the employment of it in counterpanes, rugs, blankets, carpets, sail-cloth, paper, and small cordage.

The quality of this pine-land "is generally sandy, or a mixture of sand and loam; and wherever you find a clay foundation (which is generally the case), from eight to twenty inches below the surface, those lands are to be preferred, particularly for the culture of cotton." p. 6.

He informs that the pine-lands will produce wheat, sweet potatoes, peaches, apples, cherries, pears, nectarines, plumbs, quinces, strawberries, raspberries, and grapes. He points out the invitation that the country gives to those who are willing to embark in the getting of lumber, and in the preparation of tar, pitch, and turpentine. He extols also the excellence of the soil for grazing, and lays down the advantages which favour the poor and industrious man, who sets himself down with his family in Georgia.

Having proceeded to the 27th page in these statements, Mr. S. in the ensuing eleven pages, gives a plan for an association for the purpose of encouraging the immediate settlement of the pine-lands of Georgia, and to promote the same by emigrations from Europe and the Northern States. This is comprised in seventeen articles. Then follows a geographical sketch of Georgia, which occupies the greater part of the residue of the pamphlet. After giving an account of the lati-

tude, longitude, boundaries, territorial lines, internal divisions and subdivisions of the State, he presents tables of the population, with the districts and counties, and the alterations they have undergone from time to time. The whole population, in 1791, was 82,548 inhabitants; in 1801 it had increased to 162,686. Of these, 53,968 are free white males, 48,293 free white females, 1019 other free persons, and 59,406 slaves.

We offer the following extract as a specimen of Mr. S.'s powers in historical narrative.

"Georgia being a frontier State, and, at the first settlement, only intended as a barrier to protect South-Carolina, a short historical view cannot be uninteresting to those who may be induced to become citizens.

"In the year 1732, the settlement of a new colony between the rivers Savannah and Altamaha was projected in England, for the further security of Carolina, and also to grant relief to poor and indigent families. For this purpose certain persons applied to George the second, and obtained letters patent, bearing date June 9, 1732, for legally carrying into execution what they had projected. They called the new province Georgia, in honour of the king. A corporation, consisting of twenty-one persons, was constituted, by the name of trustees, for settling and establishing the colony of Georgia. The trustees having first set an example themselves, by largely contributing towards the scheme, undertook to solicit benefactions, and to apply the money towards clothing, arming and transporting such poor people as should consent to go over and begin a settlement, and purchasing utensils for them to cultivate the land. They, however, did not confine their views to the subjects of Britain, but generously opened a door for oppressed and indigent protestants from other nations. About the middle of July, 1732, the trustees for Georgia held their first general meeting, and in November following one hundred and sixteen settlers embarked from Gravesend for Georgia, having their passage paid, and being furnished with necessary supplies for building, and for cultivating the soil. James Oglethorpe, Esq. one of the trustees, an active promoter of the settlement, embarked as the head and director of the settlers. They arrived, early in the year 1733, at Charleston, where they met with a friendly reception from the Governor and Council.

"Mr. Oglethorpe, shortly after his arrival, accompanied by William Bull, made a visit to Georgia, and, after examining the country, marked the spot where the city of Savannah now

stands, as the most proper situation upon which to begin their settlement. Here they erected a small fort, and other necessary accommodations. The people were set to work in clearing the ground, and at stated times were exercised in military duty.

"In the mean time the trustees for Georgia had been employed in forming a plan of settlement, and establishing such regulations as they judged most proper to answer the great end of the undertaking.

"In this general plan they considered each inhabitant both a planter and a soldier, who must be provided with arms and ammunition for defence, as well as with tools and plantation utensils for cultivation. As the strength of the province was the chief object, they agreed to establish such tenures of land as were most favourable to a military establishment: accordingly lands were granted upon feudal principles, and could descend only to the heirs male; and, in case the heirs male became extinct, the land reverted to the corporation. No man was permitted to depart the province without license. All forfeitures for non-residence, felonies, &c. went to the trustees for the use of the colony. The use of negroes was absolutely prohibited, and also the importation of rum. None of the colonists were to be permitted to trade with the Indians, unless by a special license for that purpose. These were some of the fundamental regulations established by the trustees of Georgia; and perhaps the imagination of man could scarcely *had* [have] invented a system of rules worse adapted to the circumstances and situation of the poor settlers, and of more pernicious consequence to the future prosperity of the province. Yet although the trustees were greatly mistaken with respect to their plan of settlement, their intentions were truly benevolent.

"Besides the large sums of money which the trustees had expended for the settlement of Georgia, the parliament of England had also granted, during the two last years, £36,000 sterling, towards carrying into execution the humane purposes of the corporation; and after a representation and memorial from the legislature of Carolina reached Britain, the nation considered Georgia to be of great consequence, and began to make more vigorous efforts for its speedy population.

"An hardy, bold race of men, inured to rural labour and fatigue, was highly necessary for enterprises of this kind. To find men of this description, the trustees turned their at-

tention to Germany and the high lands of Scotland, and resolved to send over a number of Scotch and German labourers to their infant province. When the terms were known at Inverness, one hundred and thirty highlanders immediately accepted them, and were carried to Georgia. About the same time one hundred and seventy Germans embarked with James Oglethorpe: so that, in the space of three years, Georgia received above four hundred British subjects, and one hundred and seventy foreigners.

"Afterwards a number of adventurers, both from Scotland and Germany, followed their countrymen, and added further strength to the province.

"However, notwithstanding all that Britain had done for its population and improvement, it still remained in a poor, languishing condition. From the impolitic restrictions of the trustees, these settlers had no prospect during life, but that of hardships and poverty; and, of consequence, at their decease, of bequeathing a number of orphans to the care of Providence.

"At length the trustees, finding that prosperity was not likely to be the result of their regulations, surrendered their charter to the king in 1752, and Georgia was made a royal government. In consequence of which George II. appointed John Reynolds Governor of the province, and a legislature similar to those in other provinces. John Reynolds continued in office for five years, and was succeeded by Henry Ellis, who remained Governor until the year 1760. Under their administrations the province began to flourish, and its population, agriculture and commerce greatly increased. After the year 1763, the wisdom and exertions of Governor Wright gave a new spring to industry, and the province increased with great rapidity."

The attention of Mr. S. is directed to an account of the principal rivers within the settled territory of the State; and Savannah River, Briar Creek, Little River, Broad River and Ogechee, Canuchee, Alatamaha, Appalachee, Ohoopee, Turtle, Great and Little Satilla, and St. Mary's, are particularly noticed.

He afterwards describes the chief towns of Georgia; and Savannah, Augusta, Harrisburgh, Louisville, Federalton, Montpellier, Waynesborough, Warrenton, Georgetown, Sandersville, Sparta, Greenesborough, Washington, Petersburgh, Edenborough, Elberton, Lexington, Carnesville, Clarkesborough,

Columbia, Jacksonburgh, Hardwick, Sunbury, Darien, Brunswick, Frederica, and St. Mary's, are enumerated. The following account is given of the university:

"At a meeting of the Senatus Academicus, at Louisville, on the 15th June, 1801, it was resolved that the State university should be fixed in Jackson county; and a committee, consisting of the Hon. George Walton and Abraham Baldwin, and Generals Twiggs and Stewart, were appointed to fix on the scite. These gentlemen, after viewing every situation which was supposed eligible, fixed on a height near the north fork of the Oconee River, commonly called the Cedar Shoals, which, in point of situation, is excelled by no part of the country. The hill is very high, has a fine commanding view of the surrounding country, an the north fork of the Oconee full in view; has a fine spring of water near the top of the hill, and experience has proved it to be remarkably healthy. The Hon. Mr. Milledge purchased the land for one thousand dollars, and presented it to the university. The committee then marked the spot where the buildings were to be erected, which they named *Athens*. The university is possessed of ample funds, and is under the direction of Josiah Meigs, Esq."

On the natural productions of Georgia, Mr. S. makes the following remarks:

"This State abounds with iron ore, particularly the pine woods. There are also black-lead mines, coal-mines, &c.

"Stone for building is to be found in every part of the upper country. In the neighbourhood of Augusta there are four kinds of free-stone, equal to any in the world. Mill-stones of the same species as the Cologne stones (but said to be of a superior quality), are made in many of the upper counties. Oil-stones, equal to the Turkey stone, are to be had in abundance. Within a few miles of Augusta there is a large bank of white clay or marle, now only used for white-washing. Seven miles from Augusta, red and yellow clay, used as paints, are to be had in abundance.

"The most remarkable curiosities are the ancient fortifications which are to be seen in many parts of the State; and the bank of petrified shells, which commences at Savannah River, 25 miles below Augusta, and runs through Burke, Jefferson, Warren and Washington counties, to the Oconee River. This bank of shells serves for various purposes. They make good lime for building; they make mill-stones superior to French burr; and afford the philosopher a rich variety of the frolics of nature, in petrifactions as various as they are rare.

"The forest trees are in the same variety as in the other States, with the addition of the live-oak. As this tree is daily falling under the axe of the cultivator, it would have been well for the United States to have secured some of the land. We have an exotic which seems, from its form, to have been intended for ship-timber; nothing would induce an opinion to the contrary but its quick growth. This tree is called the *Pride of India*, or vulgarly called China tree. Its form, its foliage and its flower, surpass in beauty all the trees of the forest. It makes handsome furniture, somewhat resembling the wood which is used in Cuba for ship-building, called Spanish cedar, or Spanish mahogany. If these trees would answer the purposes of ship-timber (and I hope the experiment will be made), in ten years growth they would answer for timber for vessels of one hundred to one hundred and twenty tons.

"The pine of this State is of two species: one of them differs from the pine of the northern States; has a *long leaf*, and the wood is much more durable, and is superior for any use except for ships spars, for which purpose it will not answer, being too heavy: the other, called *short leaf*, is only found intermixed with oak and hickory. Those trees, the growth of the *land*, which led to this publication, were the first subjects of oppression by an arbitrary act of the British Parliament, prohibiting the cutting down of *pine trees*, or what they called pitch and tar trees. This was the first act that was complained of by the colonists."

Though we wish the author, who appears to be very open and candid, had been a little more precise and scientific in his *mineralogical* and *botanical* descriptions, yet we are free to acknowledge that we have derived both amusement and information from his work.

ART. V. *Result of Astronomical Observations made in the Interior Parts of North-America.* 4to. pp. 16. *London.* Bucton. 1794.

THIS pamphlet is the result of astronomical observations, made in the northern parts of the western continent, chiefly at the expense of the Governor and Company of Adventurers of England, trading into Hudson's Bay. It was printed by their permission.

It appears that much credit is due to Mr. Philip Turner, who,

while in the service of the company, was enabled, by his skill in astronomical science, to settle many positions with great accuracy, and to assist in laying a permanent foundation for a correct geography of that part of America.

By the labours of Mr. Turner, the latitude of the Canadian settlement on the west branch of the Slave River is 61 deg. 16 min. and 39 sec. N. of Fort Chepawyan, on the Athapescan Lake, 58, 37, 44; of Isle la Crosse, 55, 25, 43; of York Fort, 57, 1, 51; of Albany Fort, 52, 14, 40. He has made many other observations to fix the latitudes of other places.

Herein are noted, likewise, various observations, made by Mr. Mackenzie, by Mr. William Wales, by Capt. Hanwell, by Mr. Peter Fidler, by Mr. David Thomson, Mr. Vandriel, and Capt. Cook, when at Nootka, and the adjacent places.

The curious in geographical and astronomical discoveries will examine these tables with satisfaction and profit, particularly as they have such a desirable tendency to increase our knowledge of that portion of America which lies between Canada and the arctic circle.

ART. VI. *An Oration on the Causes of the Difference, in Point of Frequency and Force, between the Endemic Diseases of the United States of America, and those of the Countries of Europe; delivered, by Appointment, to the Philadelphia Medical Society, on the fifth Day of February,* 1802. *By* Charles Caldwell, *M. D.* 8vo. pp. 46. *Philadelphia.* Bradfords. 1802.

TO compare the diseases of different parts of the world, with respect to frequency, violence and mortality, and to ascertain the result with any degree of accuracy and precision, is an undertaking of great difficulty. In order to accomplish it satisfactorily, the inquirer ought to possess materials and documents which no community have hitherto attempted to collect, and which we can scarcely hope to obtain in the present state of society. But admitting the impossibility of procuring the means to adjust the general proportion of diseases in different countries, until the existing stock of knowledge shall be greatly advanced, it is certainly in our power to form estimates, approximating nearly to the truth, of the comparative prevalence and fatality of particular diseases in the countries thus drawn into comparison. Great advantages

may be expected to arise from this inquiry if judiciously managed. It leads directly to an investigation of the origin and causes of diseases, and renders every observation of this kind more comprehensive, accurate and interesting. The contrast which in this manner is presented to the mind of the inquirer, directs his attention to many objects of importance, which otherwise might escape without notice. And thus nations may equally avail themselves of the sufferings and felicities of other countries, to obtain instruction as to the means of lessening the evils and improving the advantages of their own condition.

Instead of attempting a general comparison of the diseases of Europe and the United States, which is rendered impracticable within the limits of an oration by the extent and complexity of the subject, Dr. C. confines himself to the consideration of *endemic* diseases. From such as may come under this title, he selects *bilious* and *inflammatory*, or, in other words, *summer* and *winter* diseases; including in the denomination of summer diseases, intermittents, common remittents, malignant fevers, cholera and dysentery; and in that of winter, catarrh, peripneumony, rheumatism, &c. He ascribes the greater frequency and force of bilious diseases in the United States to the excess of summer heats—to the excess of humidity—to the abundance of vegetable substances which are suffered to perish and putrefy on the earth—to the excessive consumption of animal food and ardent spirits—and to the impurity of the water used by many. The greater frequency and violence of winter diseases are attributed to great and sudden changes in the sensible qualities of the atmosphere, which are often very remarkable in the United States—to the neglect of wearing flannel under-clothes—and to the extension of that diathesis which is produced by the heat and exhalations of summer into the diseases of winter.

Dr. C. makes the following observations on *cholera infantum*, or what he thinks might not improperly be called *Americana pestilentia infantum.*

"The frequent and melancholy ravages of this disease have rendered a knowledge of it by far too general and familiar among us. I need not, therefore, inform you, that it makes its appearance only in the summer season, that it is a modification of bilious fever, that it prevails chiefly in our cities and low marshy tracts of country, and is confined to children under three years old.

"As far as I have had an opportunity to inform myself,

this disease is peculiar to the continent of America. In no transatlantic author, either ancient or modern, have I been able to find the smallest account of it. Even when the inhabitants of Europe were much more afflicted by bilious diseases than they are at present, the pestilence of children was either unknown to them, or the medical writers of that period have been strangely inattentive in withholding its name from the records of their profession. Neither in the history of the Hungary fever of Evagrius, in that of the endemics of Italy by Lancisi, nor in those of the bilious diseases of Spain, Portugal, and the United Provinces, given by different authors, have we the slightest account of the summer complaint of children.

"Whence, then, is this exemption to the countries of Europe, and why does the disease under consideration rage with such violence in the United States? Are the children of our country possessed of a peculiar and connate irritability of bowels surpassing that of the children of Europe? Or does the bowel complaint, to which the former are so subject, arise from some external agency, which has never shed its influence beyond the Atlantic? Perhaps the following considerations may throw some light on this curious and uninvestigated subject.

"Cholera infantum, or the pestilence of children, appears to originate, in subjects predisposed to it, from the action of two exciting causes.

"1st. A suspension of cutaneous action, accompanied necessarily by a suppression of perspiration. And,

"2dly. Excessive and morbid irritation excited in some part of the alimentary canal.

"The first of these causes excites disorder in the stomach and bowels *indirectly*, or by means of sympathy, in the same manner as a coldness, or want of due circulation and action in the feet, is oftentimes productive of dyspepsia and headach. But the latter operates *directly*, in the same way as a caustic or other active stimulant gives rise to excessive action and inflammation, when brought into immediate contact with the skin.

"By far the most extensive and powerful agents in suppressing perspiration are sudden changes in the atmosphere, from heat to cold, and from dryness to moisture. Hence it is well known that the disease under consideration is not only originally excited, but rendered much more obstinate and fatal, by means of such changes. In the summer season it is not

uncommon for hundreds of children, in the city of Philadelphia, to be attacked by this disorder in a very short time after the sudden succession of cold and damp to a previous continuance of hot and dry weather. Such an occurrence has also, in general, a striking effect in heightening the malignity and danger of cases of the disease already in existence. But, in the course of this address, we have had occasion repeatedly to remark, that these atmospheric changes are much more frequent, as well as much greater, in the United States than on the European continent. Their effects, therefore, on the systems of children, already predisposed to bilious fever by the influence of miasma, must necessarily be more extensive and pernicious. I am also informed, and believe my information to be correct, that in Europe young children are more generally defended against the injuries of the weather by flannel under-clothes than in the United States. This neglect to accommodate the dress of infants to the nature of our climate, does mischief beyond calculation, in increasing the frequency and violence of cholera.

"There is reason to believe, that, in the United States, children are more indulged in the use of improper food than in transatlantic countries. I allude particularly to the use of unripe and acid fruit, and other crude vegetable substances. What is more common among us, in the summer season, than to find children of ten or twelve months old devouring cherries, currants, green apples, pears, peaches, cucumbers and radishes? Yet what can be more pernicious in their action on tender and highly irritable stomachs, which require aliment of the most bland and digestible nature? But I have been oftentimes assured, by intelligent and observing travellers, that in the countries of Europe the case is different. There children are denied the use of sour and unripe fruit, and confined to aliment more suited to their condition.

"A humid atmosphere, variable weather, and the use of improper food, operating on systems predisposed to bilious fever by heat and exhalations of summer, appear, then, to be the principal sources of cholera infantum. And to the greater extent and power of these causes in the United States than in the countries of Europe, am I inclined to attribute our exclusive subjection to this formidable disease."

Dr. C. concludes his comparative estimate of the diseases of our country with the following brief recapitulation, which offers very important advice to the community.

"From the foregoing body of facts and reasonings, it ap-

pears that the causes of the frequency and force of the endemic diseases of our country may be divided into general and local, or natural and accidental. The general or natural are, the excess of our summer heats, the frequent, great, and sudden changes in the temperature of our atmosphere, and the flatness and depression of many parts of our country, connected with our copious precipitations of rain. Over these the power of man is capable of exercising but a very limited controul. We can neither impoverish the fountain of the intense heats of summer, elevate to a greater pitch above the level of the ocean the low lands of our middle and southern States, nor lock up the chambers of our northerly winds. In attempting to gain such an ascendency over nature, the philosophy of art would degenerate into folly. Nor are we able to stay the sluices of the heavens, when they are about to pour forth on our country a superabundance of waters.

"But, with regard to our local or accidental sources of disease, the case is different. These we are competent to modify and destroy. We can remove from around our habitations the putrefying recrements of organized bodies; we can clear and cultivate our natural meadow-lands; and enrich our fields by means of manure, instead of more slowly attaining the same end, by suffering them to lie for years in a waste and weedy state. Further, we can erect our dwellings on elevated situations, defend them from the exhalations of mill-ponds and neighbouring marshes by interposing ranges of trees; and, by means of flannel clothing, protect our persons from the changes of the weather. Nor is this all. We can substitute vegetables for part of the animal food which we now consume, malt liquor and cider for our high wines and ardent spirits, and, in other respects, live in conformity to the genius of our climate. These objects fall within the sphere of our power, and it is no less our duty than our interest to attain them. Such an issue would contribute equally to individual health and happiness, and to the prosperity, strength and aggrandizement of our country. Let us, then, like Cadmus of Tyre, wage a war of extermination with these hydras of disease, that our posterity may live in security from their ravages. The voice of patriotism combines with that of nature and of reason, to urge and animate us in the important enterprise."

ART. VII. *Annual Oration, delivered before the Chemical Society of Philadelphia, January* 31, 1801. *By* Felix Pascalis, *M. D. Vice-President of the Society.* 8vo. pp. 48. *Philadelphia.* Bioren. 1802.

THE author of this oration seems to feel much interest in the improvements which chemistry has received within a few years, and to be very sanguine in his estimate of the advantages to be expected from it in extending our knowledge of nature, and in advancing the progress and utility of the arts. We are happy to agree with him in these expectations, and to participate the pleasure which every lover of mankind must enjoy in the contemplation of such a prospect.

Dr. P. gives some brief notices of a few among the numerous and brilliant discoveries which have been made by modern chemistry. He mentions the application of chemical principles and facts to the improvement of particular manufactures, in which the public good is greatly concerned, and especially to the correction of errors in pharmacy, and the promotion of many other important medical inquiries.

Such of our readers as wish a more minute account of this performance will be gratified by a perusal of the oration at large.

ART. VIII. *The Female Monitor, consisting of a Series of Letters to married Women on Nursing and the Management of Children. By the late* Hugh Smith, *M. D. With occasional Notes, and a Compendium of the Diseases of Infants. By Dr.* John Vaughan. 12mo. pp. 224. *Wilmington.* Brynberg. 1801.

THE reputation of Dr. Hugh Smith's Letters, as a popular and instructive work, is so well known to our readers, that we shall not detain them by any unnecessary remarks on that subject. Dr. Vaughan has rendered an acceptable service to the public, by giving a new impression of these Letters, accompanied with notes, which illustrate many passages expressed in a manner not sufficiently clear, correct some errors, and supply occasional deficiencies. In addition to this task, which Dr. V. has judiciously performed, he subjoins a compendium of the diseases of infants, in which the reader will find, reduced within a small compass, many valuable admonitions, conveyed in a perspicuous, familiar and impressive manner.

ART. IX. *Essays Mathematical and Physical; containing new Theories and Illustrations of some very important and difficult Subjects of the Sciences. Never before published.* 8vo. pp. 274. *With a Series of nine new Tables for calculating the Latitude and Longitude at Sea, by Means of double Altitudes and Lunar Distances. New-Haven.* Morse.

BY examining the preface of this work, we find it to be the performance of Mr. J. Mansfield, which was announced in our vol. iii. p. 301. We are very well pleased to find that a mathematical book, written in America, and treating of so many important subjects, has made its appearance. Having got a sight of it but just before this sheet went to the press, we can do little more than notice its title, and inform our readers of the contents.

The essays are on the following subjects: 1. *Use of the Negative Sign in Algebra.* This is offered as an original dissertation, composed with a view of obviating the difficulties which occur in the study of algebra, and the higher branches of the mathematics. 2. *Goniometrical Properties.* The author, in this piece, lays claim to some originality from the manner of discussing the subject, which he hopes will be found more short, clear and easy, than that of other English writers. 3. *Nautical Astronomy.* In this tract, though the first principles are necessarily the same with those contained in all the elementary books on this part of the science, still he believes that the solutions of several problems, the practical method of finding time, with some of the problems on latitude, longitude, and the rules for ascertaining parallax and refraction, are new. 4. *Orbicular Motion.* This essay is given as chiefly original. With a few exceptions, the matter has never before been investigated, and his manner of doing it is in opposition to the modern theory of the tides. 5. *Investigation of the Loci.* 6. *Fluxionary Analysis.* 7. *Theory of Gunnery.* 8. *Theory of the Moon.*

But we cannot do more than thus respectfully mention this work at present.

ART. X. *A Treatise on Dentistry, explaining the Diseases of the Teeth and Gums, with the most effectual Means of Prevention and Remedy; to which is added, Dentition, with Rules to be observed during that interesting Period. By* B. T. Longbothom, *Surgeon-Dentist.* 12mo. pp. 67. *Baltimore.* Prentiss & Cole. 1802.

A DOLLAR was the price which Mr. L. exacted from subscribers for this twelve-penny pamphlet. But this the good-natured purchaser could have excused, if the value of the contents had compensated for the littleness of the book.

In this piece we observe the writer employs "scrophul*ous*" repeatedly (p. 25, 28, 32, &c.) instead of *scrophula;* he confounds the word "sceptic" with *septic* (p. 19, &c); he cautions against giving "stimula*tives*" (p. 26); and writes of tooth-ach from "*cariated*" *bone* (p. 32). In several places he has mentioned "saliv*er,*" when we suppose he meant *saliva;* though we must do him the justice to observe that *this* mistake is corrected in his table of errata. He writes "fossips" instead of *forceps* (p. 39). In giving directions for the use of the tooth-brush, he advises (p. 17) that it "be used in a transverse direction, direct up and down;" which seems to be equivalent to employing it just *lengthwise across!* "Any tooth-ach may be mitigated by *a few drops of nitre in spirits!*" (p. 28); and so forth.

After this sample of the surgeon-dentist's performance, our readers will, we have no doubt, excuse us from analysing its pages more minutely. We shall therefore dismiss it, by informing them that Mr. L. after condemning the dentifrices and applications of all other operators in his way, as improper applications, informs his subscribers *very modestly*, on the last leaf, that *his* dentifrice, *antisceptic* lotion, tooth-soap and opiate, stand unrivalled! But we are tired of such trash and imposition.

MEDICAL & PHILOSOPHICAL NEWS.

DOMESTIC.

Correspondence in the Navy Department.

AMERICAN IMPROVEMENT IN THE DISCIPLINE OF SHIPS.

VARIOUS have been the expedients employed to render ships and sea-vessels as healthy as habitations on shore. Many attempts have been made to remove the unwholesome exhalations engendered within them, by VENTILATION. And many machines and projects have been contrived to accomplish that end. The labours of the Rev. Stephen Hales are well remembered for expelling fetid and introducing fresh air. This was a most desirable object.

Numerous also have been the attempts to increase the wholesomeness of vessels, by FUMIGATION. The end proposed by these processes was to destroy the mischievous qualities of putrid and pestilential air, by means of certain vapours circulated through the infected hold, cabin and spaces between the decks. The proposals of Messrs. SMITH and MORVEAUX are among the most recent of the schemes of this kind. It is generally known, they consist in emitting nitrous and muriatic acid vapours through contaminated portions of atmosphere, to correct their vitiated qualities. This is a very imposing but deceitful project.

In the American navy another expedient has been adopted; that is, ALKALIZATION. This is to be effected by means of pearl-ash and barilla, the two alkalies which form the bases of soaps used in house-keeping; and its object is to introduce into ships, which are human dwellings afloat, the same maxims and modes of purification which have been employed with perfect success in the domestic economy of houses or human habitations on shore. This is a noble example set by the directors of American naval affairs to all the maritime governments. It is to be hoped they will soon adopt it on board their ships, both in military and commercial service, and thereby extinguish pestilential vapours.

Letter to the Secretary of the Navy, dated City of Washington, February 3, 1802.

"SIR,

"Pursuant to the request you made, I reduce to writing the project of introducing alkaline salts into the navy of the United States.

"It is estimated that a pound of hard soap will do the washing of ten persons for one week. Such a family would thus consume fifty-two pounds of soap in twelve months.

"Hard soap is a compound of barilla and tallow, slush, or some greasy thing. Frequently the manufacturers blend with the barilla a portion of rosin or turpentine, because these articles are cheaper than animal fats. In all soaps the only *active* material is the barilla. The sole use of the other ingredients is to put it in a *form* convenient for use. But this barilla, too, is the *dearest* article employed in the manufacture of soap. Hence the artists contrive to put as little of it as possible into the composition of their soaps. A great proportion of their profit consists in selling to the consumers grease and rosin at the barilla price. This is one of the mysteries of the trade.

"There is a great inconvenience attending the employment of *soap* at sea. This is the decomposition of it by *salt* water. It being always impossible to employ soap to advantage with water drawn *from the ocean*, and it being often impossible to afford a supply of *fresh* water from the store-casks, soap is of very limited use at sea. Accordingly it has rarely or never entered into a seaman's ration or allowance, in any of the best disciplined navies. Mariners must purchase it from the pursers, or go without it. The latter is commonly the fact. To this source may be traced much of that disgusting nastiness in the persons, clothing, bedding and apartments of seamen, which every person must have observed who has been a voyage to a distant port. And from this nastiness, so accumulated, proceed the poisonous exhalations which so often impair the health and destroy the lives of the crew. The free and seasonable use of barilla can prevent the external source of this mischief among sailors, by the same means that it counteracts, *in daily use*, uncleanness and pestilence in well alkalized and neat habitations on shore.

"It is a curious fact, that, disguised in soap, men are all their lives in the habit of employing barilla, without knowing either its existence or name!

"There are *soft* soaps which are very efficacious in domestic economy. These are fats united to *pot-ash* instead of

barilla. And they are of great strength and efficacy, because they contain a much larger proportion of a stronger alkaline salt. In naval economy they would be highly serviceable, were it not that they, like the former, or hard soaps, are decomposed by *salt* or *ocean* water: of course their use at sea must also be very circumscribed.

"But, comfortably for mankind, it happens that alkaline salts can be employed in *naval* as well as *domestic* economy, without being concealed under the cover of either *hard* or *soft* soaps. They may be employed to great advantage in their native or proper forms. And a few barrels of pearl-ash (which is only a milder form of pot-ash), or of barilla, ought to be put on board as a part of the stores of every well equipped ship.

"Soaps are known to be operative *only* in proportion to the *barilla* or *pot-ash* they contain. In sending barilla or pearl-ash, then, you send those ingredients for which *alone* soaps are useful and valuable; and, by being less bulky, much stowage is saved by the exchange.

"It may be estimated that not more than a third of common soap is alkali; consequently, *three* pounds of soap will not be more efficacious than *one* of barilla or pot-ash, provided due care is taken to avoid waste. Five ounces and one third ought, therefore, to serve ten men for one week; and the supply for one of our forty-four gun ships, carrying 312 men, for a twelve-month, would be somewhere about 858 avoirdupois pounds. This, however, only refers to *personal* cleanliness. When it is considered that a liberal provision of the alkali ought to be made for scrubbing, scouring, and overcoming all manner of uncleanness, both in the ship itself, and every thing the ship contains, the quantity ought doubtless to be about double.

"Nothing can be more plain than the use of it. When mixed with *fresh* water, a very small quantity is to be employed to make a suds, or to impart to the water a slippery feel. This is the ley for washing clothes, and for scrubbing floors, berths, utensils and timbers. When employed with *ocean* water, it will turn of a white or milky colour. But salt water requires more alkali to make a ley than fresh water does. There must be enough added to give it also the lixivial or slippery feel. Clothes may be soaked and washed immediately in this milk-coloured water, without straining it or letting it settle. And ocean water may be alkalized and pre-

pared the more effectually for scrubbing the cabin and whole inside of the ship by the same means.

"Another advantage will result from this practice when adopted. The ships will be the longer preserved from rotting. Nothing contributes so much to the rapid decay of timber, and the rusting of iron and copper, as nastiness. The prevention of this by alkaline salts, then, will have the double effect of preserving the lives of the men, and the durability of the vessel. I only wish the plan to be fairly carried into operation; and, under special instructions from the Secretary of the Navy to some of our intelligent commanders, I have no doubt of its prompt and perfect execution.

"I have the honour to be, &c.

"SAMUEL L. MITCHILL.

"*Hon.* ROBERT SMITH, *Secretary of the Navy.*"

A Section to be added to the Collection of Naval Regulations, issued by command of the President of the United States, on the 25th January, 1802.

RULES FOR PREVENTING THE OFFENSIVENESS AND NOXIOUSNESS OF SEPTIC VAPOURS.

1. When provisions are spoiling, or putrid, they should be brought upon deck, or corrected by pouring on them, in the cask containing them, a ley of pearl-ash, barilla, or of common wood-ashes.

2. When the store-room or hold shall have become foul or sickly from putrid exhalations, it shall be cleansed by washing and scrubbing with similar alkaline ley.

3. Where a berth and its bedding shall have been rendered nasty during sickness, or from unavoidable necessity, they shall be rendered clean by scouring with a mixture of pearl-ash, barilla, or wood-ashes, in water.

4. The clothes of the sick, and all surgeon's bandages and applications, not thrown overboard, shall be soaked, alkalized and cleansed in like manner.

5. Whenever *fresh* water cannot be spared for washing the clothes of the crew, there shall be issued to them a quantity of pearl-ash or barilla sufficient to render *salt* water capable of being washed with.

SPONTANEOUS DECOMPOSITION OF A FABRIC OF SILK.

On the night of March 19th, 1802, during the session of Congress at Washington, Jonathan Dayton, one of the sena-

tors then attending from the State of New-Jersey, sustained a loss of a pair of black silk stockings in an uncommon manner. On undressing himself at bed-time, his stockings were the last of his garments which he took off. The weather being cold, he wore two pair, the inner of wool and the outer of silk. When he stripped off the silk stockings, he let them drop on a woollen carpet lying by the bed-side; and one of his garters, which was of white woollen ferretin, fell down with the stockings. The under-stockings, on being pulled off, were thrown at some distance, near the foot of the bed. He observed, on separating and removing the silk stockings from the woollen ones, that there was an unusual snapping and sparkling of electric matter. But as he had been long acquainted with the appearance, it attracted but transient notice.

He fell asleep, and remained undisturbed until morning, when the servant entered to kindle the fire. The man observed that one of the leather slippers, lying on the carpet, and partly covered by one of the stockings, was very much burnt. Mr. Dayton then rose, and found that the leather over which the stockings had lain was converted to a coal. The stockings were changed to a brown, or what is commonly called a butternut colour. And although, to the eye, the stitches of the legs, and even the threads of their clocks, appeared to be firm and entire, yet, as soon as an attempt was made to touch and handle them, they were found to be wholly destitute of cohesion, their texture and structure being altogether destroyed. Nothing but a remnant of carbonic matter was left, except that a part of the heel of one of the stockings was not decomposed.

Though this destruction of the stockings took place during the night, when nobody saw the manner and circumstances of the process, yet there was evidence enough of the evolution of much caloric while it was going on: for every thing in contact with the stockings was turned to coal or cinder. Beside the slipper before mentioned, the garter was burned. It had fallen partly on the carpet, and partly on and between the stockings. As far as it touched the stockings it was perfectly disorganized and carbonated, and immediately beyond that limit was as sound as ever. The part of the carpet, with its fringe, which lay between the stockings and the floor, was in like manner totally destroyed, just as far as it was covered by the stockings, and no farther. The wooden plank, which was of pitch-pine, was also considerably scorched; and beneath the place where the thickest folds of the stockings had

lain, was converted to charcoal or lamp-black to a considerable depth. In throwing down the stockings when they were pulled off, it happened that about a third part of the length of one of them fell not upon the carpet, but upon the bare floor. This part of the stocking was decomposed like the rest, and the floor very much scorched where it had lain.

There was very little fire on the hearth, and the little there was, was eight or nine feet distant. The candle had been carefully extinguished, and stood on a table in another direction, and about equally distant. Indeed, no application of burning coals or of lighted candles could have produced the effects which have been described. It would seem that the combustion, if it may be so called, proceeded from a surcharge of anticrouon (caloric), or electron (electricity), in the silk, accumulated by means not well understood; and that, not being referable to any known external agent, it may, in the present state of our information, be termed spontaneous.

The substances chiefly consumed were leather, wool, silk, and resinous wood. The linen lining of the slipper was indeed destroyed as far as the leather it touched was destroyed. But where it did not come in contact, it escaped, and the fire showed no disposition to burn even the linen beyond the boundaries prescribed to it on the leather.

What is the theory of this phenomenon? With what other facts is it immediately connected? Whatever men of science may determine on these points, one thing seems to be evident, that if spontaneous combustion can happen thus to bodies so little inflammable as leather, silk and wool, that instances of its occurrence in bodies easier to burn are more frequent than is generally supposed.

RAPID DISORGANIZATION OF THE HUMAN BODY.

A letter to Gen. William Shepherd contained information, that on the night of the 16th day of March, 1802, in one of the towns of the State of Massachusetts, the body of an elderly woman evaporated and disappeared from some internal and unknown cause, in the duration of about one hour and an half. Part of the family had gone to bed, and the rest were abroad. The old woman remained awake to take care of the house. By and by one of the grand-children came home, and discovered the floor near the hearth to be on fire. An alarm was made, a light brought, and means taken to extinguish it. While these things were doing, some singular appearances were observed on the hearth and the contiguous

floor. There was a sort of greasy soot and ashes, with remains of a human body, and an unusual smell in the room. All the clothes were consumed; and the grand-mother was missing. It was at first supposed she had, in attempting to light her pipe of tobacco, fallen into the fire, and been burned to death. But on considering how small the fire was, and that so total a consumption could scarcely have happened if there had been ten times as much, there is more reason to conclude that this is another case of that spontaneous decomposition of the human body, of which there are several instances on record. It is to be regretted the particulars have not been more carefully noted.

On the Part which the Imagination acted in the Experiments at the Bristol Pneumatical Institution, with Nitrous Oxyd.

Our readers remember the accounts given, in the course of our work, of the surprising effects ascribed to a species of air which those who manufactured it called "nitrous oxyd." (See Med. Rep. vol. iii. p. 27, 200, and 207). This production was an *artificial* thing, formed by decomposing or distilling nitrate of ammoniac in a convenient apparatus. And this nitrate of ammoniac too was an *artificial* thing, formed synthetically, by adding nitrous acid to volatile alkali. This kind of gas, therefore, seldom or never is produced in *natural processes.* Though some of the persons who have treated of it have mistakenly confounded it with the noxious air emitted from corrupting substances, it is totally a different production; and experiments made upon "this nitrous oxyd" have no more resemblance to, or connection with, "septic acid gas," than experiments upon the freezing of water have with the variation of the magnetical needle. Yet there has, in this case, been something more unfortunate than the confounding two productions which are very unlike. There has been a degree of credulity exercised in relating the effects wrought by "nitrous oxyd," which is really laughable, and makes the whole subject ridiculous.

The following recital shows, that if the imagination be duly prepared, common air will perform as great wonders as nitrous oxyd. Professor Woodhouse administered (as he writes in his letter to Dr. Mitchill of March 5, 1802) ten gallons of atmospherical air, in doses of from four to six quarts, to several gentlemen who were previously impressed with the idea that they were going to breathe the nitrous oxyd. Quickness of the pulse, dizziness, vertigo, tinnitus

aurium, difficulty of breathing, anxiety about the breast, a sensation similar to that of swinging, faintness, weakness of the knees, and nausea, which lasted from six to eight hours, were the symptoms produced by the common air we breathe, when acting under the influence of the imagination!—But we believe these deceptions imposed upon the world about "nitrous oxyd" are now pretty well understood.

ARROWSMITH'S MAP OF AMERICAN DISCOVERIES IN THE NORTH.

The best map of the new discoveries in the geography of North-America, is the one published in London, 1796, by A. Arrowsmith. This map exhibits an interesting view of the land and water towards the arctic regions of our continent. It is on a large scale, and extends from about 43 to almost 70 deg. N. from Lake Michigan to Repulse Bay. It includes also all the known space from East Greenland and Newfoundland, westward, to Bering's Straits, beyond Alaska and the Fox-Islands, and even to the East Cape of Kamschatka; reaching from about the 40th to the 170th degree of longitude west from Greenwich. The regions lying between James's and Hudson's Bays, and the spine called the *Stony Mountains*, are as particularly delineated as the materials obtained from the Hudson's Bay Company, and other sources, would allow. This ridge runs from N. W. to S. E. and is said to be, in some places, 3520 feet high above the level of their base. All the discoveries of Hearne and Mackenzie are embodied in this map. It contains a view of rivers, lakes, and water-communications, from Lake Erie, N. W. to the Lake of the Woods, up through Lake Winnipeg, the Black Bear, and Buffaloe Lakes, to the "Land's Height;" and beyond that down the streams through the Arathapescow and Slave Lakes to Whale-Island, in the Northern Ocean, at lat. 69 deg. 14 min. At this place the sun does not set on the 11th July. There is not a tree to be seen; and the mountains are covered with snow.

OLMEDILLA'S SOUTH-AMERICAN CHART.

The best map of this vast continent is the *Mapa Geographica del America Meridional, dispuesto y gravado por D. Juan de la Cruz Canoy Olmedilla*, Geographer to the King of Spain, and published in 1775. The original Spanish has been republished in London, by Fader, in 1799, and is declared to be an exact copy of the original, which had become scarce.

Its size is about six feet long by four broad, and it presents a grand and instructive view of the Spanish and Portuguese provinces, and of the great mountains and rivers. It does not embrace the groupes of West-India Islands, but comprises all the region between Curazao, in the latitude of about 12 deg. N. and the extreme point of Terra del Fuego, in the lat. 56 deg. S. It exhibits the country from the eastern points of Paraiba and Ferrambuco, in Brazil, long. 36 deg. W. from Greenwich, to Cape Blanco and Point Santa Helena, on the Gulf of Guayaquil, in Peru, in about 78 deg. The River Amazonas, with its streams Beni and Negro, are vast currents: so are the waters of the Parana, the Urucuay, and the Pilcomayo, which unite their supplies to form the Rio de la Plata. The greatest rivers on the globe run eastwardly from the Andes. Olmedilla's Map includes very little of the country north of the Province of Panama.

Discussion concerning the Employment of the Thermolampe for supplying Light-Houses; between Mr. Gallatin and Dr. Mitchill.

No. I.

The Secretary of the Treasury presents his compliments to Dr. Mitchill, and requests him to favour him with his opinion on Mr. Henfrey's exhibition, and on the proposition made through the channel of the Commissioner of the Revenue, who has the immediate superintendance of light-houses.

The question is, whether there is any thing in Mr. Henfrey's mode of extracting or applying inflammable air, which would justify an experiment, at the expense of government, to ascertain whether the fuel consumed in extracting the quantity of gas necessary to produce a certain light costs less (contingent expenses included) than the quantity of oil necessary to give the same light?

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No. II.

Opinion on the Case submitted by the Secretary of the Treasury, concerning the Economy of illuminating Light-Houses according to Mr. Henfrey's Project.

The cheapest and brightest light we are acquainted with among terrestrial bodies, is that which is emitted from *flame* or *blaze*. The material of blaze is inflammable air; and from the singular qualities of a burning body in a gaseous or aëriform state arise the peculiar phenomena which characterterize flame

—a moving, wavering, and pyramidal combustion of inflammable air.

All flame, from whatever material produced, is inflammable air. The basis of inflammable air is a constituent part of all natural and artificial substances which exhibit blaze as they burn. Both *vegetable* and *animal* substances, as they undergo decomposition by fire, are enabled to exhibit flame for no other reason than because a stream of inflammable air rises from and hovers over them, burning as fast as it is disengaged.

The candles in our parlours, whether made of tallow, wax, or spermaceti, emit inflammable air as they burn, and *therefore* burn with *flame*. The same is true of fats and oils, which, whether burned in entries, withdrawing-rooms, streets or beacons, blaze solely because of the inflammable air they emit while undergoing decomposition by fire.

Wood of all sorts burns with blaze, because of the inflammable air which escapes from it. And the flame is great in proportion to the quantity and rapidity of the inflammable gas discharged by the fuel.

The patentee, in the present instance, has merely invented an apparatus for exhibiting the flame at the orifice of a pipe or *tube indefinitely long or remote*, instead of showing it, as is usual, *in the immediate vicinity* of the material affording it. This is all. And so much for the principle of the thing.

Now for the economy of it. Inflammable air is equally the material of flame in all known cases. The simple question is, whether *pine wood*, by the patentee's process, will furnish inflammable air, for the purpose of a light, as cheap and good as *whale oil* in the present mode? Experiments alone can determine this.

I have my doubts, as I told the patentee; first, because the cost of the wood to be enclosed in the iron cylinder, added to the cost of the wood consumed in expelling the inflammable air, may possibly, in some places, amount to more than the price of oil: secondly, I fear that the supply of the inflmmable air will be unsteady, and that, in spite of all his care, the light will sometimes intermit for a longer time than mariners would wish: thirdly, it seems to me that there must be an additional expense to labourers and watchmen to tend the fire and manage the apparatus incessantly.

However, knowing how imperfect human judgment is in all such researches, and of how little avail our reasoning *a priori* is in physicks, I should regret that a public trial should not be made. Moderate and careful encouragement of useful

projects has a liberal and dignified air; and if the Secretary of the Treasury and the Commissioner of the Revenue can, consistently with their public duty, authorise a trial to be made, I should recommend it as worthy the risk. S. L. M.

To the Hon. Albert Gallatin, Secretary of the Treasury.

Capitol (Washington), April 30, 1802.

Account of a North-east Storm, or Memorandums towards a Theory of the Winds in the Region between the Gulf-Stream and the great Range of Mountains.

On the Atlantic coast of America, north-east storms begin in the south-west, and proceed thence to windward, at the rate sometimes of about one hundred miles an hour. It has been remarked long ago by Dr. Franklin, that storms from the north-east, on the eastern side of this continent, begin in the opposite point, or to leeward. Whether this rule universally obtains may perhaps as yet admit of some doubt. But during the uncommonly mild winter of 1801—2, there was a strong confirmation of it.

On the 21st, 22d, and 23d of February, 1802, there was one of the most remarkable and long-continued snow-storms that had been known for twenty years. It raged with extreme violence on the land, and was the cause of several shipwrecks along the sea-coast. Many lives, and much property were lost. The movements in the atmosphere were felt first to the southward, and gradually progressed northward, so as to be sensible there; but not until after some hours.

The facts were collected, by Dr. Mitchill, at Washington, the seat of the National Government, during the session of Congress, when they could be ascertained with the greatest expedition, correctness and care, and are as follow:

After a fine, warm and clear morning, the air, toward evening, grew cloudy, and it became rainy and stormy. The time of its commencement near the capitol, on the banks of the Potomack, as observed by Gen. Smith, was about *half an hour past five* in the afternoon; and before eight the rain was excessive, and the wind boisterous. Here the weather did not become cold enough for snow until towards morning.

The city of New-York, which is situated rather more than 240 miles to the N. E. did not feel this commotion of the atmosphere until about *eleven*. Then the city-watchmen observed that the weather was changed from clear to cloudy, and that snow began to fall; and at twelve, Mrs. Mitchill, who opened a window and looked out, observed that the ground

was already white with snow. The tempest was brewing, and, properly speaking, was formed at two.

That night Mr. Humphrey Wood was on board a sloop bound from Newport (R. I.) to New-York. The tempest drove the vessel ashore, before morning, on Mount-Misery Neck, upon Long-Island. They sailed from Fisher's Island, where they had been waiting for a fair wind, at 10 o'clock at night, with a wind at E. S. E. and warm and pleasant weather. But *by midnight* it hauled E. N. E. and blow a gale, with snow. Fisher's Island may be computed to be about 140 miles E. N. E of New-York.

Mr. Webster observed some of the phenomena of this change of weather, in its beginning, at New-Haven. This place is 89 miles from New-York, or 331 from Washington. Here the weather was clear in the early part of the evening, but was overcast by nine. The stormy commotion of the atmosphere seems to have begun *about twelve*.—At Boston it was rather more than an hour later.

Mr. Blair, an officer who was on board one of three ships from Salem, in Massachusetts, that were lost on Cape-Cod during the storm, related, after his escape, that the weather, on the day of their sailing, Sunday, Feb. 21, was remarkably fine and favourable. At sunset they were about four leagues from Cape-Ann light-house, with a light breeze from S. E. *After midnight* the weather grew very threatening; and at *half past two in the morning* of the 22d the wind veered to the N. E. and it snowed so fast that the ships could hardly discern each other.—The shipwrecks during this storm were numerous and dreadful. Many persons were frozen to death. Salem is distant from Washington 499 miles, or 257 from New-York; so that this latter place is about midway between the two places.

At Portland, in Maine, distant 603 miles from Washington, the snow began between day-light and sun-rise. It was observed by young Mr. Vaughan, who was travelling on the morning of the 22d. At 8 A. M. the wind blew violently.

The storm began still later at Hallowell, on the Kennebeck River. This place is 683 miles from Washington. There the sun rose clear on the morning of the 22d. The air became cloudy in about a quarter of an hour. The snow began about eleven, and the storm had become furious within two hours after. Professor Waterhouse and Benjamin Vaughan, Esq. have particularly attended to these curious meteorological facts.

At Poughkeepsie, 82 miles N. of New-York, and situated beyond the first range of mountains, the storm began about 4 o'clock on the morning of the 22d. And at Albany, 165 miles north of New-York, it did not begin until a little before day-break on the morning of the 22d.

At Providence (R. I.) Dr. Wheaton observed the evening of the 21st to be clear and pleasant. The watchmen informed him "the weather changed before 12 o'clock, and continued cloudy, with variable winds, until the violence of the storm began, which was at half past three on the morning of the 22d."—Providence is 439 miles from Washington.

Accounts from Charleston (S. C.) state that it began there on the 21st, between two and three o'clock in the afternoon. —The distance of Charleston from Washington is 550 miles. —By the newspapers it appears to have been felt in the Bahama Islands.

It will be found, on calculation, that between Charleston and Cape-Ann, along the coast, this stormy movement proceeded to windward at the rate of nearly one hundred miles an hour: for, as it began at Charleston, say at three o'clock, at New-York at eleven, and off Cape-Ann at two the next morning, there is a difference of eight hours between Charleston and New-York, and of three hours between the latter city and Salem, making in the whole eleven hours. Now, computing the distance from Charleston to New-York at about 800 miles, and from New-York to Cape-Ann more than 250, there will be a sea-coast of almost 1100 miles swept over by this storm in somewhat more than eleven hours. But this computation applies only to the sea-coast: for if we take any given point, as the city of New-York for example, and instead of N. E. reckon due N. it will be found that the progress is considerably slower: for it took all the time between eleven at night and day-break next morning to reach Albany, only 165 miles distant in that direction.

Now, these remarks explain some meteorological facts, which, though of common observation, have hitherto seemed paradoxical or unaccountable: for mariners know, that to form a good judgment of wind and weather, they must keep a look-out for clouds and changes of atmosphere *to leeward*. In New-York, the rain or snow which accompanies a N. E. storm can be seen, by labourers along the docks and wharves, in the S. W. at Staten-Island, ten or eleven miles distant, for some time before it begins in the city, so as frequently to break off work, and put away their tools. And it is con-

firmed, by long observation among the farmers in that vicinity, that snow-banks, as they term them, are to be seen in the S. W. many hours before the atmosphere where the observers are is clouded in the smallest degree, or any current of air perceptible. They remark, further, that a judgment can be formed of the weather by noting whether the gathered clouds lowering in the distant horizon are visible to the northward or southward of the setting sun. If at sunset they are to the S. of the sun, they predict a north-east storm, with snow; if to the N. a south-east storm, with sleet or rain.

Observations and Reflections on Storms, and some other Phenomena of the Atmosphere. In a Letter from Professor Waterhouse to Dr. Mitchill, dated Cambridge (Massachusetts), March 20, 1802.

"DEAR SIR,

"Your letter of the 8th instant, requesting information of the precise time the late wide-spreading storm commenced at this place, came to my hands evening before last. I hasten to gratify you as far as I am able.

"Sunday, the 21st of February, the day preceding the storm here, was remarkably calm and pleasant. The smoke ascended from the chimnies in a straight column. The thermometer at noon was 47. Neither hygrometer nor barometer indicated, at that period, any disposition of change in the atmosphere. As late as half past ten at night, the sky was clear and starlight. At about two hours and a half after this, viz. one o'clock in the morning of the 22d, the snow-storm began. My information comes from an intelligent market-man who set out from his own house for Cambridge at midnight. Excepting for a few hours on Wednesday, 24th, we saw not the sun for nine days. It was the longest, if not severest snow-storm I ever knew.

"I here send you an abstract from the *official* meteorological observations* kept in this university by Mr. WEBBER, *Pro-*

* *Some Meteorological Observations.* 1802.

	Barom.	*Therm.*	*Hygr.*	*Wind.*	*The Sky.*
Feb. 21, 9 P. M.	29 80	27	56	N. W. weak.	Few clouds.
22, 7 A. M.	29 60	25	84	N. very strong.	Wholly cloudy.
2 P. M.	29 30	17	83	Do.	Do.
9 P. M.	29 24	12	83	Do.	Do.
23, 7 A. M.	29 61	1	80	N.W. very strong.	Mostly cloudy.

"A severe snow-storm continued through the whole of the 22d. The falling snow was very thick; the wind very strong, and somewhat to the E. of N. but appearing to me, by the college vane, to be nearer to the N. than the N. E. It was noted N.

fessor of Natural Philosophy. You will observe it commences at 9 o'clock in the evening of the 21st. I did not think it necessary to add any thing respecting the magnetic needle.

"I can readily conceive several good purposes may be answered by this inquiry. I have therefore written to *Kennebec* and to *Halifax*, and requested my correspondent at the last place to extend his inquiries to *Newfoundland*. I hope you will extend yours to *Pensacola*, and even to *Jamaica*. The severity of the storm was from north-north-east; that is, north, two points to the east, being, you know, what the ancients termed *aquilo*. These observations will probably strengthen the opinion prevalent in this quarter, that all our severe *north-east* storms begin first, in point of time, in the *south-west*. Franklin was first led to notice this, on being prevented by a stormy sky from observing an eclipse of the moon at Philadelphia, when at Boston, 400 miles north-east of that city, the hemisphere was sufficiently clear for that purpose.

"The ancients had some strange notions of the *local origin* of winds. They speak of them as something different from air in motion, and as if the matter of the winds were a hot vapour or exhalation from caverns in the earth, where *Æolus* kept them in chains, only when his churlish majesty chose to let them loose, like so many bull-dogs, to scare *Juno*, and worry her favourites. This fable, however, is, like almost all those of the ancients, pregnant with wisdom. Lord Bacon himself has laboured to teach mankind how to make *Æolus* subservient to *Juno*, and so did Franklin. The transition from winds to rain and snow is easy and natural.

"It has always impressed me with something bordering on wonder, that, during the *six-and-twenty centuries* wherein the memory and learning of mankind have been exercised, there has not been found one *secretary of nature* sufficiently instructed to give us a complete history of *the ascent of vapours from the ocean, their suspension in the air, the formation of clouds, of snow, and of the descent of rain, with an entire and connected chain of causes.* Des Cartes, Nieuwentyt, Dr. Halley, Hunter, and some few others, have amused the world with their theories on this subject; but which of them is unincumbered with difficulties? What facts we have

"The scale of the barometer is French measure, but is here reduced to the English or common scale, and correction made for the effect of variation in temperature. The instruments are placed without a north chamber window."

in this sublime part of nature are mere fragments widely scattered. The phenomena in these lofty regions of the air have been rather terrific objects to purblind superstition, than instructive appearances to calm philosophy.

"The never-ceasing circulation of water between the ocean and the dry ground has been contemplated, from the earliest ages, with grateful admiration; but not being an object of sight, has been ranked among the inexplicable works of Deity. The clouds dispensing refreshing showers of rain on the dry and thirsty ground; the flow of rivers, with their long train of beneficial consequences, could hardly escape the notice of any thinking being in every age of the world. We accordingly find the supply of water frequently mentioned in the OLDEST BOOK we have, among the most wonderful, as well as valuable of Heaven's blessings.

"Seeing the earth annually covered with a rich and beautiful carpet of vegetables, and these astonishingly variegated, and gradually developing '*from seed time to harvest time*,' must have led those of ancient days to recognize the proximate causes, the warmth of the sun, and the moisture from the clouds; and these again to an acquaintance with that perpetual circulation subsisting between the ocean and the mountains, through the instrumentality of the atmosphere, and by the medium of rivers to the ocean again. But the philosophy or explanation of this vivifying phenomenon is spoken of as inscrutable and past finding out. They did then, as we do now, carry our investigations as high as we can, as in the case of *gravitation*, and beyond that principle say, with them, '*it is the hand of God;*' an expression denoting the last term of our analytical results. Unable to investigate the essence of *light* and of *fire*, the Deity was called by the name of these inexplicable agents.

"In those early days, when the knowledge of nature was confined to narrow limits, they, like our Indians,

'Saw God in clouds, and heard him in the winds.'

Hence they stiled the Deity 'the *father* of the rain,' and represented him as '*calling forth the waters of the sea, and pouring them down according to the* vapour *thereof.*' Whence we infer, they believed the water rose in the form of *vapour* from the ocean, and that it became *freshened* in its passage through the air; and it moreover appears that they were sensible that this process was regularly and perpetually performing; for they remarked that '*although all the rivers run into the*

sea, yet was the sea not full; unto the place whence the rivers come, thither they return again.' They seem also to have known that MOUNTAINS made a part of this GRAND APPARATUS, and to have believed that it was not a fortuitous or random process, but regulated, as we now find it, by weight and measure. May not this be inferred from that sublime question of Isaiah—'*Who hath measured the* waters *in the hollow of his hand, and weighed the* mountains *in scales?*'

"Although they discerned this magnificent apparatus, and saw its effects, yet were they restrained by a religious awe from attempting its investigation, because *storms, lightning* and *hail*, were conceived to be the precursors of the chariot of the Deity! '*who maketh the* clouds *his chariot*'—'*who walketh on the wings of the* wind'—accompanied with '*hail-stones and fire!*' Or, if you choose to have the spirit of these passages expressed in English metre—

'On cherubs, and on cherubims,
'Full royally he rode,
'And on the wings of all the winds
'Came flying all abroad.'

For this reason, probably, the origin and course of the winds, '*whence they come and whither they go,*' were deemed mysterious. Hence, instead of investigating the cause, their pious minds, overwhelmed with awe, sunk into undiscerning amazement! Under such impressions, I cease to wonder that he who wrote that ancient drama, the book of *Job*, puts among the most difficult of his questions that which demands an explanation of the '*balancing of the clouds.*' But shall not we, who are happily free from the terrors of the Mosaic, as well as Pagan systems, and who enjoy the encouraging *intellectual* scheme of Christianity, which, never forgetting Deity, postpones every thing *corporeal* to the *primary mental cause**—I say, shall not we unite our efforts to fill up that dreary blank left in science by the ancients? And 'as man, who is the servant and interpreter of nature, can act and understand no farther than he has, either in operation or in contemplation, observed of the method and order of nature,† let us commence a patient observation of the ordinary and extraordinary phenomena that occur in this scene of wonders, the atmosphere; and then collect those fragments of knowledge, widely scattered through the world, on the same subject.

* Harris.
† Novum Organ. Scient.

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Hence they stiled the Deity 'the *father* of the rain,' and represented him as '*calling forth the waters of the sea, and pouring them down according to the* vapour *thereof.*' Whence we infer, they believed the water rose in the form of *vapour* from the ocean, and that it became *freshened* in its passage through the air; and it moreover appears that they were sensible that this process was regularly and perpetually performing; for they remarked that '*although all the rivers run into the*

sea, yet was the sea not full; unto the place whence the rivers come, thither they return again.' They seem also to have known that MOUNTAINS made a part of this GRAND APPARATUS, and to have believed that it was not a fortuitous or random process, but regulated, as we now find it, by weight and measure. May not this be inferred from that sublime question of Isaiah—'*Who hath measured the* waters *in the hollow of his hand, and weighed the* mountains *in scales?*'

"Although they discerned this magnificent apparatus, and saw its effects, yet were they restrained by a religious awe from attempting its investigation, because *storms, lightning* and *hail*, were conceived to be the precursors of the chariot of the Deity! '*who maketh the* clouds *his chariot*'—'*who walketh on the wings of the* wind'—accompanied with '*hail-stones and fire!*' Or, if you choose to have the spirit of these passages expressed in English metre—

'On cherubs, and on cherubims,
'Full royally he rode,
'And on the wings of all the winds
'Came flying all abroad.'

For this reason, probably, the origin and course of the winds, '*whence they come and whither they go*,' were deemed mysterious. Hence, instead of investigating the cause, their pious minds, overwhelmed with awe, sunk into undiscerning amazement! Under such impressions, I cease to wonder that he who wrote that ancient drama, the book of *Job*, puts among the most difficult of his questions that which demands an explanation of the '*balancing of the clouds.*' But shall not we, who are happily free from the terrors of the Mosaic, as well as Pagan systems, and who enjoy the encouraging *intellectual* scheme of Christianity, which, never forgetting Deity, postpones every thing *corporeal* to the *primary mental cause**—I say, shall not we unite our efforts to fill up that dreary blank left in science by the ancients? And 'as man, who is the servant and interpreter of nature, can act and understand no farther than he has, either in operation or in contemplation, observed of the method and order of nature,† let us commence a patient observation of the ordinary and extraordinary phenomena that occur in this scene of wonders, the atmosphere; and then collect those fragments of knowledge, widely scattered through the world, on the same subject.

* Harris.
† Novum Organ. Scient.

" Although much of the operations going forward in the atmosphere may have some links that have hitherto escaped the most inquisitive eye, and others, though seen, may not be fully understood, still we ought not to be discouraged. These detached links will one day be united, and form a part of the great chain of natural causes, adding still stronger proofs of that *unity of design* which pervades the great Temple of Nature.

" Some men seem destined to observe and record naked facts; others, of a superior genius, follow after and apply them. Some future Franklin may do with these *desiderated* facts what Newton did with those collected by Kepler and Galileo, and therewith form a system which may teach us to bridle the *winds* themselves, and render them farther subservient to human uses."

Pot-Ash turning to Salt-Petre (or becoming saturated with Septic Acid) on the Surface of dead Flesh.

The people of Virginia are famous for the great quantity and excellent quality of their bacon. On killing their hogs in autumn, a large proportion of the meat is cut up into hams, shoulders, midlings, and flitches of bacon, and very little is salted down into what is called pickled pork.

In the course of experiments upon the art of curing and preserving their hams, they have fallen upon a method which is preferable to the sprinkling them with salt-petre. This is to rub them with a quantity of nice hickory ashes (which are always strongly charged with caustic pot-ash) instead thereof. This alkali is rubbed on at the time the muriate of soda, or common salt, is applied. The effect of it is excellent. The gammons are kept in better order than when salt-petre is employed, and their flavour and juices are more exquisite. But what is more remarkable, is the fine ruddy colour which the hams gradually acquire, equalling those which have been perfectly salt-petred, and looking exactly like them. Many of the planters and other house-keepers are so entirely convinced of the superior economy and excellence of this form of caustic pot-ash, that they would not use salt-petre if it could be got upon the easiest and cheapest terms.

Now, these remarkable facts seem to admit of an obvious and luminous interpretation, corresponding exactly with a multitude of other phenomena. In common salting of meat, the septic acid of the meat unites with the soda of the salt into a septite of soda, while the muriatic acid combines with the ani-

mal substance into a muriate of meat. If pot-ash is added, the septic acid will be attracted by it, and turned to a septite of pot-ash, or salt-petre. The hams are less vitiated and tainted than they otherwise would be: for, by employing pot-ash, the nasty and *noxious septic acid is neutralized, and a salt-petre formed on the spot*; and, when *formed on the surface of a gammon*, reddens it, and makes it tender as effectually as if *it had been imported from India:* Therefore caustic pot-ash is better for preserving flesh than septite of pot-ash; because the one can absorb septic acid—the other is saturated already.

Project for relieving Disorders of the Human Constitution by diminishing the Pressure of the Atmosphere upon it.

A machine has been lately invented in England for removing the weight of the atmosphere from the leg or arm. It is affirmed that, by this operation, a powerful effect is wrought upon the whole frame; and that gout, rheumatism, and other painful diseases, have been relieved and cured by it. The beneficial operation of the machine is said to be aided by admitting watery steam or other vapours into the partially exhausted recipient where the limb lies.

The apparatus consists of a copper vessel or receiver, circular and oblong, with a cavity large enough to contain the fumigation, and with an opening sufficient to admit the upper or lower extremity. The orifice through which the limb is introduced is supplied all around with ox-bladder; and, by means of a running string, it is connected with the limb, and rendered air-tight. This being done, an air-pump, which is a part of the apparatus, and joined with the receiver containing the limb by a metallic tube, is set to work, and as much air drawn out as the operator deems to be sufficient. And afterwards, when he judges it to be proper, he admits into the chamber or receiver where the limb lies a quantity of steam or vapour from a heated vessel, graduated by a thermometer, which are parts of the machinery. And this kind of *vapour-bath* is suffered to act upon the parts as long as it seems necessary.

This is a vapour-bath, and it is believed to be a most excellent one: for it would not seem that there was any thing considerable done in the way of exhaustion, when there was nothing to resist the pressure of the incumbent atmosphere but an ox-bladder. And though it should be conceded that there was as much exhaustion made as the living body could bear,

yet the equilibrium would be instantly restored on the admission of the vapour.

It would be a curious process to try what would be the effect of a diminished atmosphere upon the human constitution in certain diseases; and it would be agreeable to have correct accounts of some well-devised experiments to that effect.

THERMOLAMP.

This is an apparatus for separating the phlogiston (hydrogen) of wood, or other inflammable bodies, from their carbon, and less volatile ingredients, and burning it by itself.

In ordinary combustion, the carbon exhibits to the eye the appearance of a *solid* and red-hot substance, while the phlogiston evaporates, and manifests itself in the form of a *fluid* and ignited matter. The former of these is termed *live-coals*, and the latter *flame* or *blaze*. Common *flame* is seen in the neighbourhood of live-coals, and wavering and hovering over their surface. These appearances, however, are only observable when fuel containing carbon and phlogiston is burned IN THE OPEN AIR, or exposed to ATMOSPHERICAL INFLUENCE.

The modern theory of these processes is, that a portion of the gaseous oxyd of light (phosoxygen, or oxygenous air, as it is called) is decomposed on the surface of the fuel; and while the oxygen combines with a portion of the carbon, and flies off in the form of carbonic acid gas, the heat and light are disengaged, and become sensible to the touch and sight on the surface of the remaining carbon: then the phlogiston begins to be set loose from its connection as a constituent part of the fuel, and, combining with a portion of the antierouon (caloric), turns to inflammable air; but no sooner has this inflammable air acquired the due degree of heat, than it combines with another portion of the atmospheric oxyd of light, and turns to water or aqueous vapour. The two fluids, or their bases, thus converted to water, give out the heat and light which are discoverable in blaze. This is the explanation of the common process of combustion and inflammation.

Now, this being understood, the theory of the THERMOLAMP will be easily comprehended. It merely consists of exposing wood, or any other kind of fuel, or, in short, any thing that contains carbon and phlogiston, to a high heat, in a CLOSE APPARATUS, instead of doing it in the open air. The consequence of such heating is plainly this: Atmospherical air being excluded, and no oxygenous gas or oxyd of

light being present, it is impossible, in this close machine, that either the carbon can turn to fixed air, or the phlogiston to water. But the former will remain in the bottom of the apparatus, in the shape of *tar*, *charcoal*, or *lamp-black*, while the latter will be driven off under the guise of *inflammable air*, more or less carbonated. And this may be conducted through pipes and tubes to any distance, and let out through as many holes or apertures as the operator pleases.

It is known that *mere* inflammable air cannot burn: to exhibit flame it must come in contact with the gaseous oxyd of light: consequently it is impossible that it should inflame until it is discharged from the close machine in which it was produced. Instantly on its liberation it may be set on fire, and will continue to burn with a beautiful flame as long as the fire below is kept up, or the included materials can furnish it.

Mr. Henfrey, of Baltimore, has obtained a patent for the discovery of the art of applying phlogistic gas, so evolved and so conducted, to the lighting of theatres, cities, light-houses, private rooms, &c. by means of hollow pipes leading to tapers, candlesticks and chandeliers, through which that peculiar material of blaze is made to pass. The exhibition is very beautiful and brilliant.—*See the correspondence with the Secretary of the Treasury, p.* 463.

DE VAUX ON THE DEMEPHITIZING QUALITY OF LIME.

In France an attempt has been made, at last, to introduce *lime* into infected houses as a cleanser and destroyer of what they call "mephitism," or what we denominate septic acid gas, and the nasty vapours which commonly accompany it. M. CADET DE VAUX has addressed a letter to the Minister of the Interior on the subject, and extols in high strains the "demephitizing" quality of this alkaline earth. He says Messrs. Fourcroy and Deyeux have approved his experiments and theory, and that, supported by their authority, he can boldly recommend his white-washing to destroy and prevent the mephitization of walls, &c. He puts on his lime with a mixture of milk and oil to make it stick. In America this has been matter of experimental conviction and practical utility for years. The introduction of this *weak* alkali will probably soon lead to the employment of the *stronger ones*. And when all these *powers of health and cleanliness* are properly introduced, the administrators of hospitals, prisons, ships, and private dwellings, may safely dispense with "oxygenated muriatic acid gas!!"

Cases of Pulmonary Consumption cured by a Salivation: Communicated in a Letter from Dr. Rush to Dr. Miller, dated Philadelphia, May 6, 1802.

"I have great pleasure in informing you that Dr. Parke has lately discharged a patient from the Pennsylvania Hospital, perfectly cured of a pulmonary consumption, by means of a salivation. I have likewise been again made happy in seeing the triumph of that remedy in the case of Mr. James Hunter, a young gentleman of respectable character in this city. He had been afflicted for several years with weak lungs; and, in consequence of an attack of the bilious fever last fall, became diseased with all the usual symptoms of a confirmed consumption. The salivation was advised by Dr. Physick and myself, and was continued to a severe degree for several weeks. His cough and fever left him with the cessation of the discharge from his salivary glands. I saw him on the second of this month in good health, and with a considerable increase of flesh since his recovery."

An Account of a Prize-Dissertation: Communicated in the same Letter.

"I have just seen a letter from London, in which I have observed, with great pleasure, that Mr. Alfred Thurston, of Winchester, Virginia, has received a prize from the Medical Society of Guy's Hospital for the best dissertation on the yellow fever. In this dissertation the author maintains its domestic origin, and denies its ever becoming epidemic by contagion."

PREMIUM OF THE PHILADELPHIA MEDICAL SOCIETY.

At a stated meeting of the Philadelphia Medical Society, held on Saturday, 20th February, 1802, it was resolved that a premium of one hundred dollars, or a gold medal of that value, be offered for the best Natural and Medical history of any one of the United States of America.

The candidate is requested particularly to attend to the nature of the soil commonly prevalent in any part of the country he may describe; to the effects produced by clearing the land on the climate; and the consequent influence of these causes on diseases; to the state of longevity in the inhabitants; to the flowering of certain herbs and trees as connected with agricultural operations; and, lastly, to the mineral and saline productions of the earth. He will be much aided in his inquiries by attending to the hints and subjects of ob-

servation contained in Count Berchtold's Essay to direct and extend the Inquiries of Patriotic Travellers, and in Dr. Lettsom's Naturalist's and Traveller's Companion.

To each dissertation a motto must be prefixed, and the same motto must be put on the back of a sealed letter containing the name of the author. All dissertations except that to which the prize shall be adjudged, will be returned to any person that may be directed, together with the letter which contains the author's name, unopened. The dissertations must be delivered free of expense, to the President, on or before the last Saturday in February, 1804.

BENJAMIN RUSH, *President.*
HEDGE THOMPSON, *Sec. Pro. Tem.*

ALKALIES BENEFICIAL IN THE MEASLES.

Extract of a Letter from Dr. E. Banks, of North-Yarmouth, to Dr. Jeremiah Barker, of Falmouth (Maine), dated April 21, 1802.

"I have had a great deal of business in the practice of physic since I was at your house last fall, and have had an opportunity of trying the effects of the alkaline plan in a great variety of cases. All I have time to say about alkalies, at present, is, that in almost every instance in which I have used them, they have essentially afforded relief, particularly in the measles, when they have been violent, in which they seem to have operated like a charm. I am determined, for the future, to make a very liberal use of them; for to neutralize *acids* with *alkalies* is as frequently necessary, in my humble opinion, as it is to counteract *debility* by *stimulants*."

VACCINE DISEASE.

Dr. Elisha North, of Goshen, in the State of Connecticut, who has distinguished himself by his exertions in extending the benefits of the new inoculation, is now engaged in endeavours to settle some of the contested questions on that subject. Dr. Jenner, and some others, had supposed virulent matter, accidentally conveyed from the heels of horses, affected with grease, to the udder and teats of cows, to be the cause of the vaccine pock. From facts which have lately fallen under the notice of Dr. North, he is inclined to believe that this opinion was adopted without sufficient ground; and he is confirmed in this conclusion by the result of some careful inquiries on this subject, made by Dr. Trowbridge, of Danbury.

MEDICAL COMMENCEMENT.

At a medical commencement, held on the 4th of May, 1802, in Columbia College, in the city of New-York, Joseph Bayley and Jacob V. Brower, A. M. were admitted to the degree of Doctor of Physic. The inaugural dissertation of the former is "on the origin and propagation of the yellow fever;" that of the latter, "on the use of digitalis purpurea, or purple foxglove, in the cure of diseases."

WATER-PROOF CLOTH.

To discover a process for rendering cloth water-proof, without, at the same time, filling its pores in such a manner as to prevent perspiration, has long been a desideratum. It gives us pleasure to announce a discovery which promises so many advantages, in point of health and comfort, to all ranks in the community. The patentees, Ackermann, Suardy & Co. have also applied their process to render paper water-proof as well as cloth. We have seen specimens of both in America. This invention promises to be of great service to valetudinarians, to seamen, soldiers, and travellers, by enabling them, more effectually than heretofore, to protect themselves against wet, and the consequent cold.

FOREIGN.

GALVANISM.

FOURCROY, Vauquelin, and Thenard, being engaged in making galvanic experiments, have been rewarded by the discovery of one of the most important and remarkable facts relating to that phenomenon. Though it is known that, by multiplying the plates of Volta's column, the force of the strokes, as well as the quickness of the decomposition of water, is considerably increased, yet it remained to be examined, what effect might be produced by increasing the surface of the plate. To this end the above chemists constructed a column of plates, the surface of each of which was one square foot: the strokes, as well as the decomposition of water, were the same as from an equal number of smaller plates, but the combustion of metallic wires proceeded immediately with great violence, particularly in oxygen gas, which phenomenon was not produced by a number of smaller plates.

[*Lond. Month. Mag.*

FURTHER ACCOUNT OF GALVANISM.

The celebrated philosopher, Van Marum, of Holland, and Professor Pfaff, of Kiel, have undertaken a large course of experiments to illustrate the nature of galvanism. They have charged electrical batteries of 140 feet square, by a single contact with the pile of Volta; and they have evidently proved, that this pile is a true excitatory apparatus of electricity, which surpasses, in some respects, the strongest electrical machines. They have melted, by the electricity of this apparatus, to the amount of twelve inches of iron wire, and even of wire of platina. [*Ibid.*

THERMOLAMP.

It is known that wood, on being burnt, yields one-sixth of its weight of coal and five-sixths of smoke, containing a considerable proportion of inflammable air, which is commonly wasted without use. For employing it to the purpose of heating and illuminating the room at the same time, an apparatus has been discovered by Citizen LEBON, engineer of bridges and roads, which he calls *thermolamp*, consisting of a box or vessel, in which the double advantage of heating and illuminating is united. The smoke rising out of it, freed from all vapours and soot, may be conducted through the smallest tubes, which may easily be concealed in the plaster of the walls or ceiling. They may be made of oiled silk, but the orifice must consist of metal, to prevent the burning of the silk when the air takes fire at the contact with the atmospherical air. By this apparatus chimneys become quite needless, as the flame may be conducted in a moment from one apartment to another, without leaving either soot, ashes or coals. The fire thus produced wants no particular care to be kept up, and has, besides, the advantage, that its pure light may be formed into flowers, festoons, &c. or it may be made to emit its light from above in the purest brightness. The author of this curious discovery, who announced it to the National Institute in the year seven, is preparing for publication a full account of its nature and composition. [*Ibid.*

FURTHER ACCOUNT OF THE THERMOLAMP.

A new invention has lately attracted the attention of the Parisian economists. It is called the *thermolamp*. With the smoke of five or six logs of wood, very new, from ten to twelve pounds each, carefully collected, and reduced to the state of gas or inflammable air, the inventor, Citizen Lebon,

an engineer, was able, for 24 hours, to spread, throughout seven large apartments, the mildest heat and the most vivid light, and, at the same time, to enlighten a large garden in such a manner as to make it appear like noon-day. The flame can be shown detached from all support, and can be modelled to any shape. When enclosed in a crystal globe, the flame by no means soils it. [*Gazette de France.*

NEW REMEDY PROPOSED FOR PULMONARY CONSUMPTION.

Dr. Hildebrand, Professor of Medicine at Lemberg, has been trying sugar of lead as a remedy in pulmonic consumption. Of seventeen patients whom he had under his care, he states that four were completely cured: but in the others the suppuration of the lungs had already proceeded too far, as appeared on opening them after their death. The sugar of lead is given, according to circumstances, mixed with opium. [*Ibid.*

MEANS OF PRODUCING INTENSE HEAT.

A discovery has been lately made by Messrs. Lancliffe and W. Hawkes, jun. of Newcastle-upon-Tynne, which promises not only gratification to the curious, but considerable utility to chemical science. The discovery consists in the combustion of the oxygen and hydrogen gases, by means of a blow-pipe. The gases are conducted in due proportions, by tubes, from their respective reservoirs, and made to terminate in concentric circles, where a flame the most rapid takes place, causing a heat of such intenseness, as, till now, has baffled the efforts of chemistry to produce. [*Ibid.*

COMBUSTION OF SMOKE.

The construction of furnaces capable of consuming their own smoke has long employed the attention of able artists, but all their endeavours had been frustrated, either by the troublesome complication of apparatus, or the imperfect attainment of the object proposed. This great desideratum is, however, at length supplied by an invention of Messrs. Robertsons, of Glasgow, which, for simplicity and efficacy, is truly admirable. The opening into the furnace, instead of being closed by a door, consists of a four-sided funnel or hopper, which is kept filled with coals, and, in proportion as the fuel is consumed in the furnaces, a fresh supply is constantly decending the hopper. Thus the first combustion, or

that which disengages the principal part of the smoke and flame, takes place near the mouth of the furnace, and a considerable proportion of the smoke, without any other contrivance, would be consumed by passing over the red-hot fuel in the further part of the furnace: as, however, the complete combustion of the smoke cannot take place without a further mixture of atmospheric air, this is provided for by the introduction of a cast-iron plate about three quarters of an inch above the top of the hopper, between which is thus formed a slit of the above-mentioned depth, and equal in breadth to the front of the furnace, through which a constant current of air descends, and mixes with the smoke. This aperture may be enlarged or diminished, by elevating or depressing the iron plate, by means of a pin; and, by adapting the supply of air to the quantity of smoke produced, the whole is completely burned before it has time to enter the chimney.

[*Lond. Month. Mag.*

EFFICACY OF GINGER IN THE GOUT.

It has lately been ascertained, and is confirmed by the personal experience of Sir Joseph Banks, that the powder of ginger is an effectual palliative of the gout. Sir Joseph takes two tea-spoons heaped up with ginger-powder in a pint of milk, boiled with bread and sweetened with sugar, regularly for his breakfast; and, in consequence, the fits of gout, which used to attack his head, loins, and stomach, are now confined entirely to his extremities, and are of much shorter duration. The ginger should be taken at first in smaller quantities, according to the strength of the stomach. [*Ibid.*

GERMINATION.

E. A. Lefebure, assistant chemist in the School of Health at Strasburgh, has lately made some curious experiments on germination. As he employed in his experiments only rape-seed, they cannot be considered as sufficiently varied to admit of general conclusions; but as they may furnish hints to others who may be disposed to give them greater latitude, we shall briefly state the most striking results.

Lefebure first observes that taking away the cotyledons or seed-leaves retards and weakens vegetation, but by no means impedes the germination, if the upper part of the fibre, to which the cotyledons are attached, be not removed. M. Lefebure contradicts Böhmer, who says that imbibing the moisture of the earth is performed merely by the umbilical

fibre; whereas Lefebure found, by experiments, that this function is discharged by the whole surface of the seed. The earth is merely the recipient of the matter requisite for the germination of seeds. The conditions of tenderness, moisture, warmth, and darkness of colour in the recipient, are considered as necessary to the germination of the seeds deposited in it. M. Lefebure, after the example of Bonnet, made choice of other substances for recipients, and found that the seeds germinated in several of them; but not in the oxyd of mercury, alkohol, ammonia, camphor and salt-petre; nay, oxyd of mercury, cantharides and salts, destroyed vitality and the property of germinating. Many of these matters, and particularly salts, seem to impede germination, chiefly by their requiring too much water for their solution, and by these means depriving the seeds of it; for this reason cream of tartar impeded germination the least, because it deprived the seeds the least of water. Ashes also impeded germination as long as they contained soluble salts, but as soon as they were oxydated they promoted that process. M. Lefebure examined also the different depths of the earth at which seeds germinate, the necessity of drawing the carbon from the earth, and of the access of atmospheric air. Though many cases are known in which seeds have germinated without the access of air, shut up in animal bodies or in potatoes, the matter of light, however, was not excluded.

Of the different kinds of gas of which the atmosphere consists, germination requires oxygen alone. Carbonic acid, hydrogen, and azote, on the other hand, impeded germination without destroying vitality. Seeds grew in atmospheric air, however, mixed with different substances, provided it contained oxygen. The air in which seeds had germinated, M. Lefebure found to be surcharged with carbonic acid.

He examined also, in a more accurate manner, the influence of water on germination, and found that the more foreign matter water is impregnated with, the more unfit it is for the purpose of germination. [*Philos. Mag.*

APPENDIX.

ARTICLE I.

INSTRUCTIONS FOR VACCINE INOCULATION.

LET the vaccine fluid be taken, for the purpose of inoculation, from a pustule that is making its progress regularly, and which possesses the true vaccine character, on any day from the fifth to the eighth, or even a day or two later, provided the efflorescence be not then formed around it. When the efflorescence is formed, it is always most prudent to desist from taking any more of the virus from that pustule.

To obtain the virus, let the edges of the pustule be gently punctured with a lancet in several points. It will gradually ooze out, and should be inserted upon the arm, about midway between the shoulder and the elbow, either by means of a very slight scratch, not exceeding the eighth part of an inch, or a very small oblique puncture.

A little red spot will appear on the punctured part on the third day, if the operation succeed, which, on the fourth or fifth, becomes perceptibly vesicated. It goes on increasing till the tenth day, when it is generally surrounded by a rose coloured efflorescence, which remains nearly stationary for a day or two. The efflorescence then fades away, and the pustule is gradually converted into a hard glossy scab, of a dark mahogany colour. These progressive stages of the pustule are commonly completed in sixteen or seventeen days.

A single pustule is sufficient to secure the constitution from the small-pox, but as we are not always certain the puncture may take effect, it will be prudent to inoculate in both arms, or to make two punctures in the same arm, about an inch and an half asunder, except in very early infancy, when there is a great susceptibility of local irritation.

If the efflorescence surrounding the pustule should be extensive, and occasion much local heat upon the arm, it may be cooled by the repeated application of pieces of folded linen dipped in cold water, or still more expeditiously by a strong solution of the *aqua lythargyri acetati** in water, an ounce, for example, of the former in five or six of the latter.

* Goulard's extract of saturn.

If the scab should at any time be prematurely rubbed off, the part may be occasionally touched with the undiluted *aqua lythargyri acetati.*

Vaccine virus, taken from a pustule, and inserted immediately in its fluid state, is preferable to that which has been previously dried; but as it is not always practicable to obtain it in this state, we are compelled to seek for some mode of preserving it. Various means have been suggested, but from the test of long experience it may be asserted, that preserving it between two plates of glass is the most eligible. Let a piece of common window glass be cut into squares of about an inch each, so that they shall lie smooth when placed upon each other. Let the collected vaccine fluid be confined to a small spot (about the size of a split pea) upon the centre of one of these glasses; which should be suffered to dry in the common heat of the atmosphere, without exposure to the heat of fire or the sun. When dry, it should be immediately secured by placing over it the other piece of glass. Nothing more is necessary for its preservation than wrapping it in clean writing paper.

The virus, thus preserved, when wanted for the purpose of inoculation, may easily be restored to its fluid state by dissolving it in a small portion of cold water, taken upon the point of a lancet. It may then be used in the same manner as when just taken from a pustule.

The vaccine fluid is liable, from causes apparently trifling, to undergo a decomposition. In this state it sometimes produces what has been denominated the spurious pustule; that is, a pustule, or an appearance on the arm not possessing the characteristic marks of the genuine pustule. Anomalies, assuming different forms, may be excited, according to the qualities of the virus applied, or the state of the person inoculated; but by far the most frequent variety, or deviation from the perfect pustule, is that which arrives at maturity, and finishes its progress much within the time limited by the true. Its commencement is marked by a troublesome itching; and it throws out a premature efflorescence, sometimes extensive, but seldom circumscribed, or of so vivid a tint as that which surrounds the pustule completely organized; and (which is more characteristic of its degeneracy than the other symptoms) it appears more like a common festering produced by a thorn, or any other small extraneous body sticking in the skin, than a pustule excited by the vaccine virus. It is generally of a straw colour; and when punctured, instead of that colourless, transparent

fluid of the perfect pustule, its contents are found to be opaque. That deviation from the common character of the pustule, arising from vaccine virus which has been previously exposed to a degree of heat capable of decomposing it, is very different. In this instance it begins with a creeping scab, of a pale brown or amber colour, making a long and slow progress, and sometimes going through its course without any perceptible efflorescence. Its edges are commonly elevated, and afford, on being punctured, a liquid fluid.

A little practice in vaccine inoculation, attentively conducted, impresses on the mind the perfect character of the vaccine pustule; therefore, when a deviation arises, of whatever kind it may be, common prudence points out the necessity of re-inoculation; first, with vaccine virus of the most active kind; and, secondly, should this be ineffectual, with variolous virus. But if the constitution shews an insusceptibility of one, it commonly does of the other.

When any constitutional symptoms occur in inoculated Cow-pox, they are commonly first perceptible (especially in children) on the fourth or fifth day. They appear again, and sometimes in adults, not unlike a mild attack from inoculated small-pox, on the eighth, ninth, or tenth day. The former arise from the general effects of the virus on the habit, the latter from the irritation of the pustule.

If the effluvia of the small-pox have been received into the habit previously to the inoculation of the vaccine virus, the vaccine inoculation will not always be found to stop its progress, although the pustule may make its advances without interruption.

The lancet used for inoculation should always be perfectly clean. After each puncture, it is proper to dip it into water, and wipe it dry.

The preservation of vaccine virus upon a lancet beyond the period of a few days, should never be attempted; as it is so apt to produce rust, which will decompose it.

EDWARD JENNER.

ARTICLE II.

Beneficial Effects of Digitalis Purpurea.

THE powerful effects of the digitalis have so much engaged, of late, the attention of the medical part of the world, that we may confidently expect its real merits in the cure of

diseases will, ere long, by a liberal communication from those who employ it, be duly ascertained. Its power over the arterial system is so decided, as to lead to the rational conclusion, that, by attentive, cautious, and judicious management, much good may be done with it; and we know, from the numerous communications which, through the medium of your excellent Journal, have been given to the world, that it may be administered with safety and effect. I have not been inattentive to its operations, and have been enabled, by its use, to afford very considerable relief to many patients in anasarcas and coughs, but in no instance with more clear and decided effect than in acute rheumatism. It is a disease which, in the course of my practice, I have had numerous opportunities of seeing, and can bear ample testimony to the difficulty in removing it, and to the length of time necessary for that purpose. I have principally relied on large and repeated bleedings early in the disease, and have ever found them effectual, joined with an antiphlogistic regimen; but the debility which, for the most part, succeeds such a mode of treatment, is a matter of serious consideration; and if a medicine can be discovered which, by its effect on the arterial system, will supersede the necessity of bleeding, or even diminish, in any degree, that necessity, it will be a valuable discovery: for it must be allowed that the loss of so large a quantity of blood as has frequently been found necessary to remove the disease, must have a very decided effect on the constitution, and not unfrequently lays the foundation of irremediable mischief. Having reflected much on these circumstances, and considered the wonderful power which the digitalis possesses of diminishing the action of the heart and arteries, I was determined to employ it in the first fully formed case I should meet with. Two cases occurred nearly at the same time, one only of which I shall relate, as the treatment and event were the same in both.

On the 15th of February, 1801, I was desired to visit T. B. a robust, healthy looking man, in the prime of life, of a florid complexion and sanguine temperament. He had been seized, on the 11th, with rigors, succeeded by fever and very great pain. I found his hands, knees, feet and shoulders much swelled, very red and inflamed, hot to the touch, and extremely painful, and he was totally incapable of moving himself. The skin felt very hot, was rather moist, and emitted that acid effluvia so peculiar to this disease, and which, from long experience, having found to be a constant

attendant, I consider as a characteristic symptom. His tongue was slightly furred, white, and rather moist: he complained of a considerable degree of thirst, and could not get any sleep. The urine was exceedingly high-coloured, and deposited a copious pink sediment, an appearance I have invariably observed in this disease. The pulse was full, hard, and beat 112 in a minute. I ordered him ten drops of the tinct. digitalis every six hours, and a strict antiphlogistic regimen.

My professional engagements prevented me from seeing him every day, as he lived some distance from me; it was therefore on the 17th I found that the pain, swelling, and inflammation of the joints, had in no wise diminished, and the tongue and the skin were in the same state as before. Indeed, the thirst was in some degree lessened, the urine not so high-coloured and turbid, and the pulse reduced to 104. Not having had any sleep, a draught with tinct. opii, gt. xxx. was ordered at night, and the dose of tinct. digitalis increased to fifteen drops.

I was much pleased on the 19th to find the pain, inflammation, and swelling, in both knees, so much abated as to enable him to move them freely. The feet and one hand were much better; the other hand and both shoulders in much the same state as before, as was also the tongue and urine; the skin moist and much cooler, and the pulse 80. The opiate had procured him a good night, which was repeated, and the tinct. digitalis continued. Not having had stools, a draught with infus. sennæ was ordered.

The pain, inflammation and swelling, on the 21st, was confined to the right arm, all the other parts being entirely free; the heat much diminished, the skin moist, the urine the same, and the pulse 80. He complained of a slight head-ach, which, however, lasted but a short time. The opening draught had produced two stools; but, not having slept, the tinct. opii was increased to forty drops, the tinct. digitalis continued.

On the 23d the redness and swelling had entirely disappeared, though a considerable degree of pain was felt in the knees and shoulders, accompanied with much weakness. The skin was cool, and both that and the tongue moist; the urine much paler, and without the copious pink-coloured sediment noticed in the beginning. The pulse 84. He had not had much sleep, and no motion; the aperient draught was therefore repeated, the opiate omitted till that had operated, and the tinct. digit. continued as before. I found he had not been so punctual in

taking his medicine for the last two days as he ought. He passed the 24th and 25th much better; but having again omitted his medicine, I found, on the 26th, that he had a return of pain, swelling, and inflammation in the right hand and foot. The pulse was at 84, and the skin cool and moist.

By the 28th, when I again saw him, the swelling was almost entirely subsided, without the least appearance of inflammation or fixed pain; the little pain he *did* feel was slight and wandering. The skin continued cool and moist, the urine was much paler, the bowels open, the appetite returning, and he had comfortable sleep. I now ordered him mutton broth, calve's-foot jelly, and sago, and reduced the tinct. digit. to three times in a day.

On visiting him March 1, I found, to my surprise, that the pain and swelling had returned into one hand, and, on the 3d, that it had extended to the other. The next day (4th) the symptoms were become considerably aggravated; and, on inquiry, I discovered that he had very imprudently, and contrary to my express directions, drank several glasses of mead. The tongue, though moist, had become brown, the skin hotter, and the pulse 92. He complained of head-ach and want of sleep, and was so sensible of his imprudence in deviating from my directions, that he was determined to follow them implicitly in future. I increased the dose of tinct. digit. to twenty drops.

The pain and swelling on the 7th were less, and every symptom favourable; the pulse 96. The tinct. digit. was increased to twenty-five drops.

On the 10th I was happy to find every vestige of inflammation entirely vanished; he had neither pain nor swelling any where; his appetite was good, the pulse 88, and the urine now deposited a copious lateritious sediment. From this time none of his complaints returned; the drops were reduced to ten, three times in a day; he soon recovered his former state of health, and has maintained it to this day, except occasional slight erratic pains, which rheumatic patients are for the most part subject to in cold weather.

I must here beg leave to direct your attention to the leading circumstances of this case. The symptoms, undoubtedly, indicated an high phlogistic diathesis; and I am perfectly convinced, that had blood been drawn, its appearance would have fully confirmed my opinion: yet was this disease, in general, so obstinate a one, checked in the short space of five days after the exhibition of the digitalis; and for the next six, the pro-

gress towards health was considerable. And it cannot escape your observation, that on the medicine being omitted the symptoms increased; but by afterwards duly persisting in its use, the disease was finally eradicated in little more than three weeks from the time I first saw him; and this was effected without one bleeding, or the exhibition of a single grain of nitre or antimony. I cannot conclude this case without observing, that it was as severe a one at its commencement as any I ever saw.

My patient informed me, that some years ago he was confined, in the same complaint, to his bed *seventeen weeks*, during which space he was bled *nine or ten times*.

It may not be improper to add, that the tincture I used was in the proportion of an ounce of the leaves recently dried and powdered to five of spt. of wine, and was prepared under my own inspection, with the most accurate attention. The leaves were gathered in the month of August, from vigorous, healthy plants, five or six feet high, growing on an elevated situation, and in a light sandy soil.

EDM. PITTS GAPPER.

Ewell, Surry, Jan. 8th, 1802. [*Med. & Phys. Journal.*

ARTICLE III.

OBSERVATIONS *respecting* LOUISIANA *and the* WESTERN COUNTRIES *adjoining the* MISSISSIPPI. *Made during a Visit to the City of New-Orleans, in the Year* 1801.

By JOHN PINTARD, *Esq.*

THE Mississippi, pronounced by the natives *Meschasipi*, after a course of 3000 miles, and receiving the tributary streams of the immense rivers Missouri, Cumberland, Tennessee, Ohio, and many others; all which, the St. Laurence excepted, far surpass, in extent and magnitude, every river that empties into the Atlantic, disembogues through several channels into the Gulf of Mexico, in N. lat. 29. 9. and 89. 10 W. long. from Greenwich.

The approach to this river, by sea, is known by an instant change in the colour of the water, from black or dark sea-green to whitish, next clayey, and, lastly, a very muddy, frothy water, with soundings from 70 to 50 fathoms, at about ten leagues from the coast, gradually diminishing to four fathoms at the distance of three leagues, when the water be-

comes abruptly more discoloured and yellow. Directly off the mouth of the river the water resembles dirty soap-suds: every change of colour is strongly distinguished; you pass through one to the other in an instant. The water at the mouth of the river is quite fresh. The pilots drink it, scooping it up in their hands, the usual mode of allaying thirst by all who navigate this immense river.

The entrance of the river is very difficult, there being no landmarks along the coast, which is very low, and scarcely discernible at four leagues distance. Should a vessel fall in with the land on either side of the narrow prolongation of the continent through which the Mississippi passes into the Gulf of Mexico, she will, in all probability, get embayed, and be obliged to wait a change of wind several days to beat out. This circumstance very frequently happens.

The shores along the coast are lined with innumerable trees, which are wafted, and are constantly floating down the Mississippi. The appearance is not unlike a vast mast and spar yard. The trees are very large, and on reaching the mouth of the river, are driven ashore by the winds and tides: some are carried out to sea, and are to be met with at a great distance from land. These trees accumulating, become a mound, which arrests the muddy sediment of the river, and, in process of time, form numerous small islands, which constantly increasing and uniting, at length become part of the continent. This new land is first covered with bulrushes—then with bushes resembling alders, and, lastly, with ash and other forest trees. The whole country bordering on the mouth of the Mississippi has been thus made; and the probability is, that all the land on both sides the river, from the Ibberville downwards, a distance between two and three hundred miles, has originated from the alluvions and deposits of this muddy stream. It must require a considerable time ere this new land can become useful. Where the present Balise is erected, the ground was so low, that earth was brought to elevate the foundation for the Beacon, Guard and Pilot-houses. The site of the old Balise, which was built in 1734, at the mouth of the river, is now more than two miles above. The present Balise was constructed in 1766, by Don Antonio d'Ulloa, on a small island near the south-east entrance of the river, of which, about thirty years before, there was not the least appearance. In conversation with an experienced officer in the Spanish navy, a colonist of Louisiana, on the subject of this prolongation of the continent, he informed the writer of these observations, that

in the summer of 1800 he remarked a new island at the mouth of the river. That not many years ago, when laying at Point La Hache, between the Balise and New-Orleans, a seaman died on board his ship—they sent on shore to make a grave, but could not find sufficient firm earth to bury him. This place has since become solid land. He could also recollect when Plaquemines, where the fort now stands, was all a quagmire. M. Vaudreuil, formerly Governor of Louisiana, in a letter dated September 21, 1752, remarks, "There is infinite difficulty in settling towards the mouth of the river Mississippi, on account of the immense expense in banking against the inundation of the sea and land floods. I am against settling it as yet; and for waiting until the ground be more and more raised by the accretion of soil, as it hath been *three feet* within the space of fifteen years."

Every thing concurs to show that this river has enlarged the continent nearly one hundred leagues. Not a single stone, not even a pebble is to be found in all this new-made ground. The sea repelling that prodigious quantity of mud, leaves, boughs and trunks of trees, which the Mississippi is constantly washing down; all these materials continually pushed backward and forward, collect and bind themselves in a solid mass, which thus tends to prolong this vast continent. Another striking singularity, no where else to be met with, is, that the waters of this great river, when once they overflow its banks, never return within its bed again. The reason is this:—The Mississippi is annually swelled by the melting of the snows in the north, which begins in March, and continues about three months. This river lies very deep at the upper part, and does not overflow on the east side till within one hundred leagues of its mouth; that is to say, on the low lands supposed to be new ground. These muddy grounds, like all others which have not yet acquired their due consistence, bear a prodigious quantity of large reeds, which stop and entangle all extraneous bodies that are washed down the river. The collection of all these fragments, with the slime that fills up the intermediate spaces, raises, in process of time, the banks higher than the adjacent ground, so that the waters once overflowed, are prevented, by this obstacle, from the possibility of returning into their natural channels, and are therefore compelled to force an outlet into the sea by other courses. The new land and islands at the mouth of the Mississippi are said to rise and fall with the swelling and abating of the waters. This story, however, wants confirmation.

From the astonishing length of the Mississippi, and the vast bodies of water which flow into it, one is led to imagine that it must consequently be proportionably broad. Every traveller is much surprised to find the direct contrary. Instead of entering an open, extensive bay, the mouth of the river is very narrow and contracted; and through its whole course to New-Orleans, after passing La Loutre, it scarcely exceeds half a mile in breadth. Opposite the city the river takes a considerable sweep, forming a beautiful crescent, along which New-Orleans is situated. At this place it may be about three quarters of a mile wide. The levée, or imbankment which defends the town from the inundation of the Mississippi, is elevated about three feet above the surface of the country, over which the freshets seldom or never rise. The difference between the greatest height and lowest ebb of the river is somewhere about fourteen feet perpendicular. The last two years the Mississippi had risen so very inconsiderably as to have excited much surprise, and some idle conjectures that the waters of the Missouri had found a new channel to the ocean. This river it is which raises the former, and discolours its stream; for before its junction with the Missouri it is as clear and limpid as the Ohio. The latter, although subject to great freshets, has but little effect on the Mississippi. The water of this river, notwithstanding its being exceedingly turbid, is, nevertheless, very palatable and wholesome. It is used entirely at New-Orleans for drinking and culinary purposes, the well water being very indifferent. It is carted through the city in the same manner as the New-York tea-water, and sold at the rate of a penny a bucket, or half a dollar a hogshead: deposited in large earthen jars, it becomes, after reposing, of a milky colour, and is thus used. When filtered it is as clear as crystal; to drink it in this state is a luxury not commonly enjoyed in New-Orleans. This river water is quite cool, and though used at all times, and in the highest state of perspiration, by the boatmen and labourers, no ill consequences ensue; its salubrity is such, that the inhabitants who constantly use it are said never to be afflicted with that excruciating disorder the gravel, nor to be troubled with that loathsome infection the itch.

END OF THE FIFTH VOLUME.